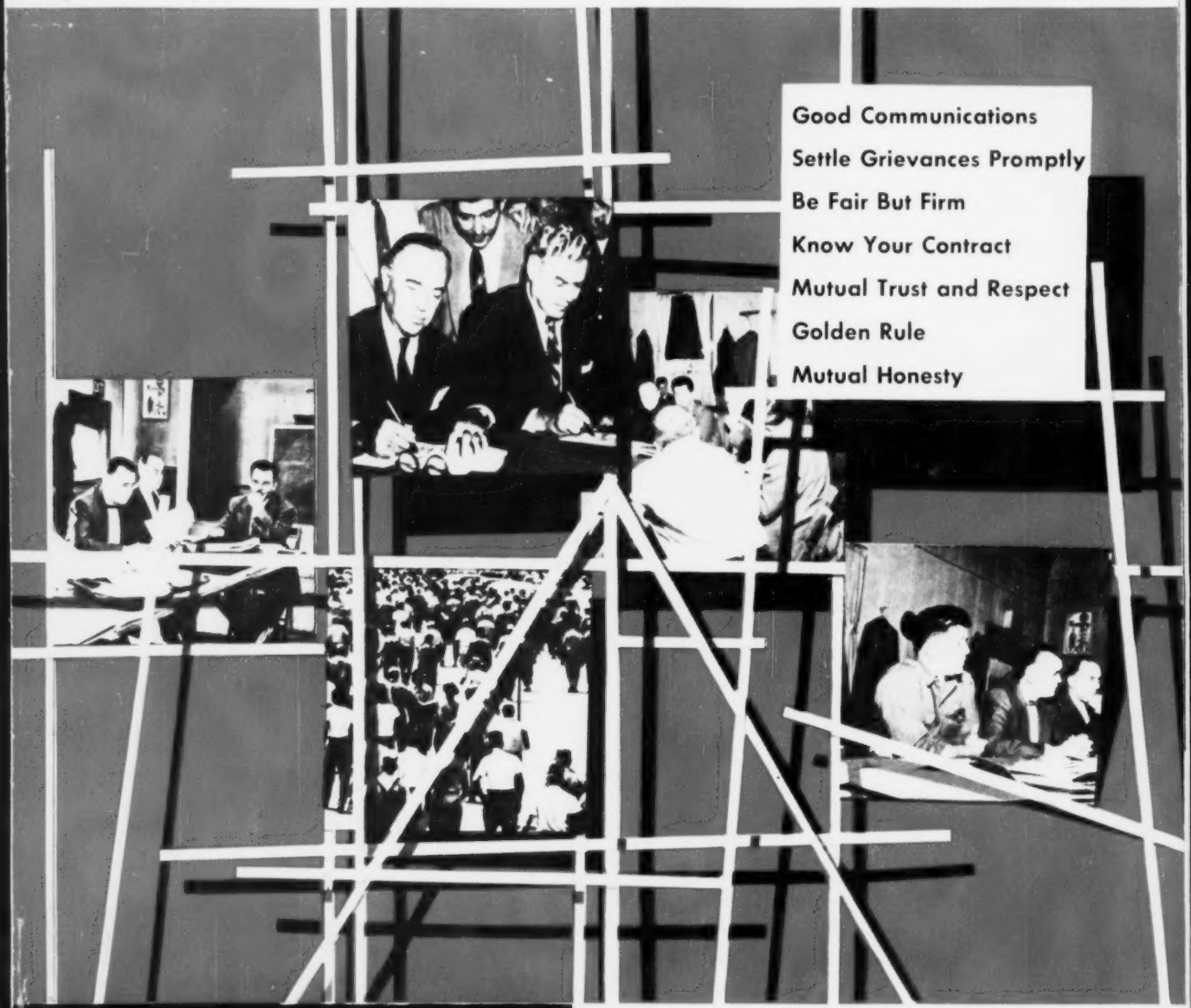
The IRON AGE
May 23, 1957
The National Metalworking Weekly



Special Survey Report

How To Build Good Labor Relations P.97

Buyers: Watch For Steel Market Shifts – P. 83

New Process Makes Steel Direct From Ore – P. 129

Digest of the Week P. 2-3

LEAD-LUBRICATED STEELS . . .

FOR "BUILT-IN" PRODUCTIVITY

Lead existing in alloy or carbon steels in the form of sub-microscopic particles acts as a natural lubricant. Its effect on your operating costs will be pleasantly surprising.

Faster speeds, faster feeds, better finish and longer tool life possible with these free machining steels are helping hundreds of manufacturers to increase production and to lower costs.

See what "lubricated" steels can do for you—specify leaded on your next Aristoloy order. Get the cost-cutting benefit of "built-in" productivity.

For further details, write for free booklet, "Lead Treated Steels."

ARISTOLOY STEELS

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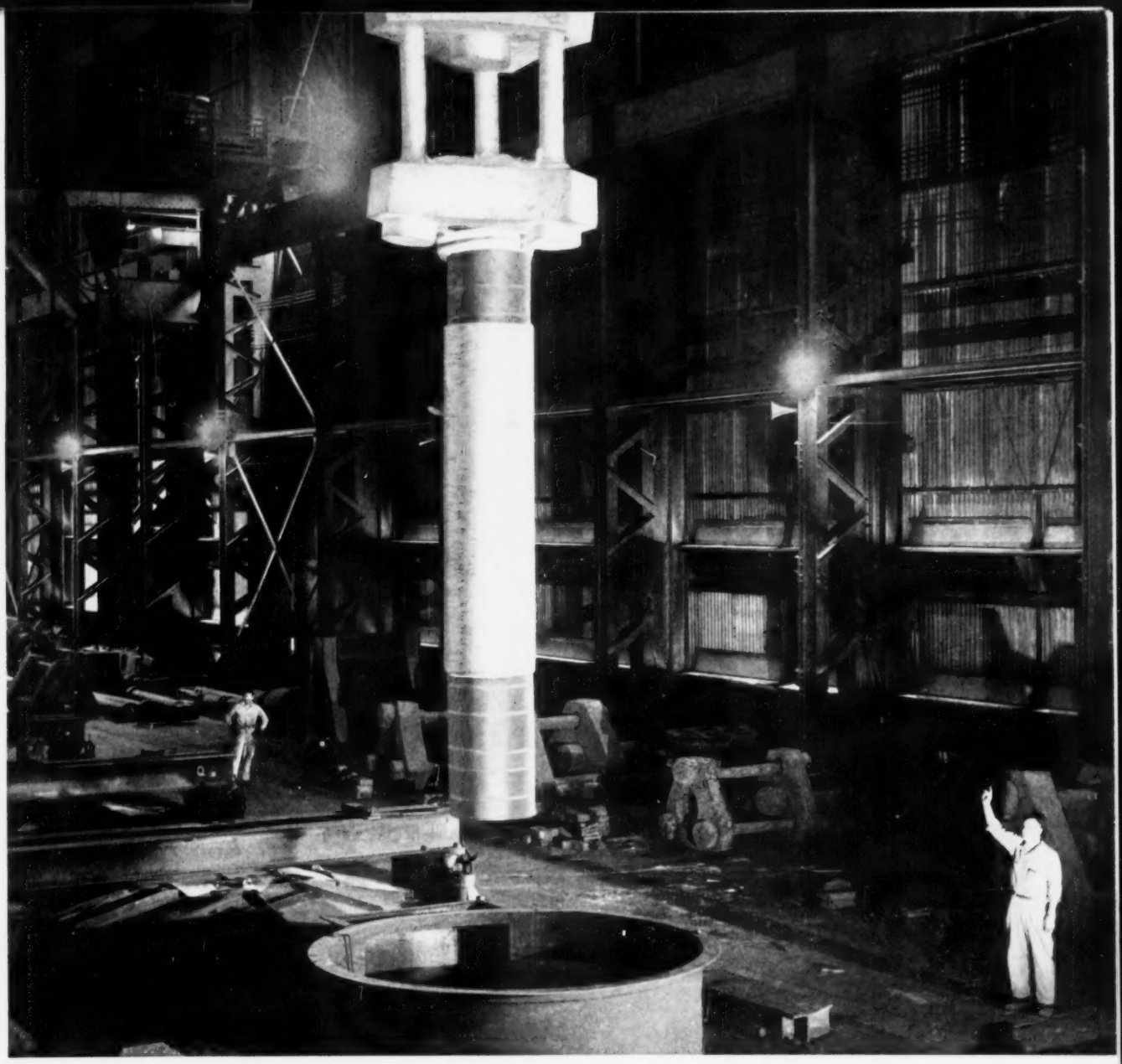

12-Ton Roll Poised for a Bath

A moment after this photograph was taken, the big heated forging was lowered into the quenching tank. Temperature of the forging and period of immersion were of course closely controlled; the forging was a steel roll in the making, and every operation had to be handled with the utmost precision.

When finished and shipped from the Bethlehem plant, the roll weighed an even 12 tons. Its overall length was approximately 17 ft; body diameter was 28 in. The purchaser ordered it to his own specifications for use in rolling aluminum.

Rolls like this require the most painstaking care, and at Bethlehem they get it. The strictest metallurgical controls are enforced at every step, beginning with the making of the steel. When a roll leaves our shops, it meets all specifications on size, finish, hardness, down to the last detail.

Bethlehem forged rolls are completely dependable for cold-rolling ferrous sheets and strip; running-down and finishing operations on copper and brass sheets; hot- and cold-rolling aluminum sheets; cold-rolling aluminum foil. Call us when we can be of service; our engineers will gladly cooperate.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

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Export Distributor: Bethlehem Steel Export Corporation

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THE IRON AGE
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Indexed in the Industrial Arts Index and the Engineering Index.

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The IRON AGE

May 23, 1957—Vol. 179, No. 21

Digest of the Week in

*Starred items are digested at right

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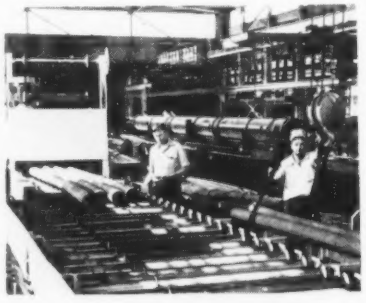
NEWS DEVELOPMENTS

What Steel Buyers Can Expect In a Changing Market

Steel mills do a lot of schedule juggling when demand starts an upswing. If 1955 market conditions



and product mixes are applied to the present, plate shipments could drop 2.5 million tons; cold-rolled could jump 3 million tons. **P. 83**

A-Bomb and Missiles Mean Cuts In Plane Output

Aircraft companies and their suppliers will shortly feel impact of Air Force cutbacks in plane requirements. New tooling opportunities will be fewer. **P. 85**

Railroads Work on Freight Car Financing Program

Eastern railroads want to start a new freight car program. But financing is a big problem. Government assistance may be sought. Some roads oppose plans. **P. 86**

Practical Tips On Handling Welfare Plans

New study shows labor and management how to improve health and welfare programs, cut their cost, and avoid waste. Specific sug-

Metalworking

LABOR HARMONY: Replies by 2000 executives to a special IRON AGE survey show that metalworking management in general is practicing good labor relations. It also indicates where there is room for improvement. **P. 97**

gestions are offered on how to deal with insurers. **P. 87**

Profit Sharing Is Paying Its Own Way

Latest reports indicate the pros are gaining ground on the cons. Internal Revenue, and Council of Profit Sharing Industries both say 1956 was a banner year. More businessmen found worker attitude made profit sharing worthwhile. **P. 88**

FEATURE ARTICLES

Is "Cyclosteel" Better Than Bessemer?

This new British-developed process for making steel directly from iron ore may be one of the major strides in steelmaking since introduction of the Bessemer furnace. It eliminates both sinter plants and coke ovens. **P. 129**

How a Tube Maker Works Zircaloy

Zirconium and its alloys offer a real challenge to engineering skill. Its hexagonal structure makes it difficult to work, and it absorbs gas when heated. This tube maker readies billets for extrusion by jacketing them in a material that has matching qualities. **P. 131**

Let Inserts Take the Rub In Diecasting

Where die castings are used, added strength, hardness and wear resistance can be had by using inserts. They can also simplify assembly. **P. 138**

Diamonds Are Cheap in Machining Glass Cloth Laminates

Abrasive cutters impregnated with industrial diamonds have proved most economical for machining tough laminates. Where a 36-in. band saw has been consuming five blades a day, one diamond blade should last for a year. **P. 134**

Fast Honing Cycles Produce Better Surfaces

The latest flat surface honing machines help Chrysler keep production costs low on critical transmission parts. Only 1½ min. is required to complete the honing cycle. **P. 136**

MARKETS & PRICES

Automakers Seek Soft Pedal For Horsepower

Engine horsepower will keep climbing. It must to meet other improvements. But the industry will stop advertising the fact. Reason: Congress is looking into the highway death toll. **P. 106**

West Coast Leads Way In Race Car Designing

California-made cars and engines again dominate the 500-mile race at Indianapolis on Memorial Day. One of the most talked-about entries from the West features an engine lying on its side. **P. 113**

Government Reviews Uniform Tool Leasing Code

Provisions of a new uniform policy for leasing machine tools from the government should give everybody a fair shake—tool builders, distributors, users and the government itself. **P. 115**

It's Inventories Versus Prices With Steel Users

Prospect of July steel price boost has users worried. Some have already decided to rebuild stocks as a hedge. **P. 185**

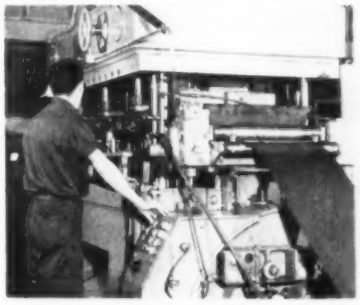
Seamless Pipe Market Shows Weakness

Mills step up sales efforts as petroleum industry buyers hold down inventories and bypass full tonnage allotments offered them. **P. 186**

NEXT WEEK

How to Get More for Your Stamping Dollar

No matter how efficient your present stamping setup is, it can probably be improved. Next week's feature shows how to get even better mileage out of tooling, reduce rejects, and improve designs.



60 CYCLE INDUCTION MELTING

Melting metals in the 60 cycle induction furnace will bring greater economy and quality to your melting and casting operations. Whether you produce zinc or aluminum die castings, brass or bronze castings, ductile iron castings, or aluminum extrusions — to name but a few fields — there is an induction furnace to do your job.

60 cycle induction melting will reduce metal losses to a minimum and eliminate metal contamination. Alloy composition is maintained uniformly, and metal temperature is closely controlled at all times. Operating conditions are ideal: worker fatigue is reduced significantly.

AJAX ENGINEERING CORPORATION has specialized in just this one field: building the best and most efficient 60 cycle induction melting furnace for the job. As pioneers of this melting principle we have accumulated considerable experience in each field of application.

AJAX induction furnaces have been instrumental in establishing new metallurgical processes such as continuous casting, continuous galvanizing, and aluminum coating of steel. Exclusive AJAX developments are the electromagnetic pump and the AJAXOMATIC for controlled pouring.

AJAX 60 cycle induction melting furnaces range in size from 20 kw to 2000 kw, produce from 150 pounds per hour up to 40 tons per hour.

MAY WE HAVE YOUR INQUIRY?

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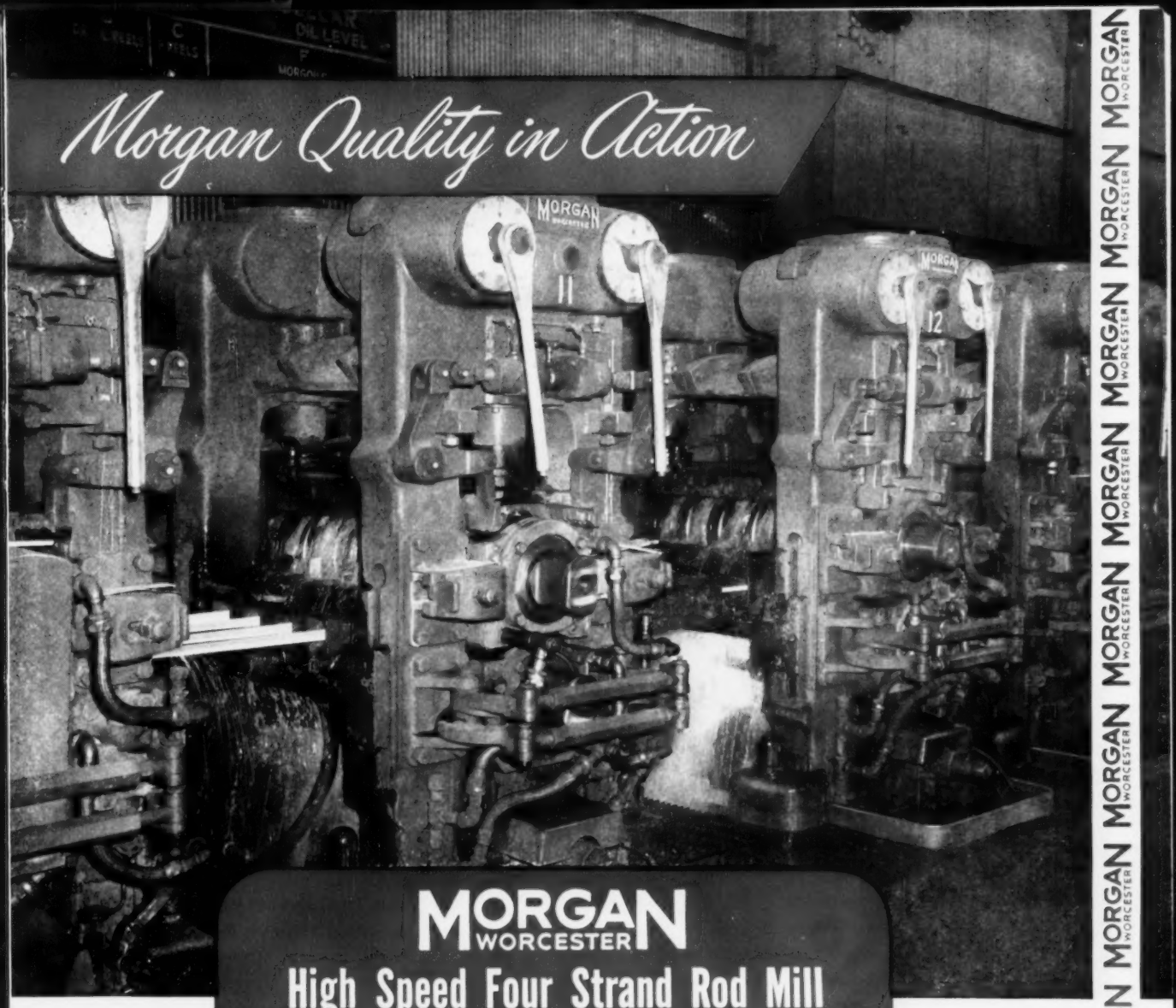
Associated Companies: Ajax Electric Company Ajax Electrothermic Corp.

Morgan Quality in Action



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Cuyahoga Works, American Steel and Wire Division

UNITED STATES STEEL CORPORATION

Morgan Mills are known to steel men throughout the world for their sound design and accurate manufacture . . . an enviable reputation which has assured mill users of efficient and trouble-free operation. Morgan Mills have kept pace with the ever-increasing demands for high output and greater accuracy of product.

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Here's Why Armco ALUMINIZED STEEL Type 2 Gives Longer Life to Outdoor Products

Its aluminum coating outlasts the coating on commercial galvanized sheets 3 to 1 in the atmosphere

Both sides of new Armco ALUMINIZED STEEL® Type 2 are protected by a special hot-dip aluminum coating that seals out atmospheric corrosion. Fifteen-year tests (before commercial production was begun) offer strong evidence of its enduring protection.

They show that the aluminum coating on Armco ALUMINIZED STEEL Type 2 has at least three times the life of a standard zinc coating on commercial galvanized steel sheets in a mild industrial atmosphere.

Costs less

Armco ALUMINIZED STEEL Type 2 costs from 29 to 15 per cent less than aluminum, thickness for thickness, depending on the aluminum alloy used for comparison. And since its greater strength usually permits lighter gages, these savings may be boosted nearly 20 per cent more. This economical steel also costs less than galvanized sheets that are to be given a field coat of paint. ALUMINIZED STEEL does not need paint.

Stronger than aluminum

Comparison of Typical Properties Armco ALUMINIZED STEEL Type 2 and Aluminum

	ALUMINIZED Type 2	ALUMINUM 3003-H12 (¼ Hard)	3003-H14 (½ Hard)	5052-H32 (¼ Hard)	5052-H34 (½ Hard)	6061-T4 *	6061-T6 **
Tensile Strength, psi	54,000	15,000	17,000	34,000	37,000	35,000	45,000
Yield Strength, psi	40,000	13,000	14,000	26,000	21,000	21,000	40,000
Elongation % in 2"	22	12	9	12	8	22	12

*Solution heat treated and naturally aged.
**Solution heat treated and artificially aged.
Modulus of elasticity for steel—about 29,000,000 psi; for aluminum alloys—about 10,000,000 psi.

Write for details

If your products are used outdoors, let us show you how Armco ALUMINIZED STEEL Type 2 can give them longer service life—at less cost. Just call the nearest Armco Sales Office, or write us at the address below.

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SHEFFIELD STEEL DIVISION • ARMCO DRAINAGE & METAL PRODUCTS, INC. • THE ARMCO INTERNATIONAL CORPORATION

What's the Outlook For Management's Health?

In case you haven't heard, there is a big hassle on about the boss's health. One group says he is sicker than he knows. Another thinks that maybe he isn't any worse than anyone else.

No one has made a depth survey to find out what the boss thinks himself. If they have, they aren't letting it out. Some doctors argue that the talk about the tough life at the top of the ladder is causing some officials to become tied up in fear knots.

Our guess is that the head man isn't tuned in on all this big rhubarb about his sanity, his heart, his kidney(ies) or his sex life. He may be worried most of the time, true. But that is the nature of the man.

Most presidents and chairmen of the board—and their runners-up—are pretty well probed by the medicos these days. If there is anything serious the matter with them, something is done. It may be hard to break them away from their decisions, work and desks—but it is usually done.

Probably a lot of captains of industry are worried about things that do not show up on the dials at the clinic. It may be that the "old man" is having a hard time living up to this zaney idea that every week or month should see a new record for the company, the industry, the nation and the world.

Of course he may be a little disturbed, too, about new ideas on how to spend your way to plenty. To him, there is still need for thrift even if it only means that you won't go to the poor house when you are older.

Perhaps another reason for those strains and wrinkles is the difficulty in finding someone who puts his heart and soul into his job. The boss may be wrong in the long, long run, but he still wants to believe that hard work, competency and taking advantage of the breaks are still necessary for success.

Some people say that our bosses work too hard and too long; that they are killing themselves on the job; that they can't get away from their business chores. This may be right but it does not mean their health is bad or that they will die off any faster than the janitor—or the local poolshark. They are mostly doing what they want to do; what they believe in. In most cases you can't change them one whit.

We need a lot more studies on those who are not bosses before we can assume that the head men are burning out faster than the next fellow.

Tom Campbell

Editor-in-Chief

At BCA, soft, absorbent, 2-ply Scott Wipers are used to wipe machines, tools, finished parts, hands, faces. They're lint-free, chemically treated for proper wet strength, and Perf-embossed® . . . a special process that gives thorough cleaning action, speedy absorption.

WIPER PROBLEM? Look what BCA did with Scott Wipers!

Precision ball bearings made by Bearings Company of America, Division of Federal-Mogul-Bower Bearings, Inc., are used world-wide in cars, trucks, tractors. They are produced on automatic screw machines. Scott Wipers were put on trial in BCA's plant, under these stipulations:

Scott Wipers were to be tried in place of cloths. The paper wipers would be adopted if acceptable to machine operators and inspectors . . . if they helped to solve the housecleaning problem . . . if they were found safer to use and if there was a cost saving realized.

Results: employees preferred Scott Wipers,* the plants were kept cleaner . . . Scott Wipers fresh from a box were sanitary . . . carried no metallic particles to scratch or cut . . . and Scott Wipers saved BCA at least $71 a month—*not* including savings resulting from eliminating hidden costs of handling, weighing, storing and dispensing cloth wipers!

Want to see improvements like this in your plant? Call your Scott man today or write Scott Paper Company, Department IA-75, Chester, Pa.

SCOTT PAPER COMPANY

Makers of the famous Scott paper products you use in your home.
Consult your local TV schedules for Scott's program, "Father Knows Best."

*Patent Pending

LETTERS FROM READERS

White Collar Drive

Sir—I was impressed with an article in your Apr. 11 issue dealing with union plans for a drive on White Collar workers.

I wonder if I might have your permission to mimeograph a copy of this article, giving due credit to your magazine, and distribute it to the members of our organization. —D. E. Carroll, Executive Secretary, Piedmont Associated Industries, Inc., Greensboro, N. C.

▪ Permission granted.—Ed.

Can You Help?

Sir—I am a German immigrant in search of a job in a plant working for acid protection. In my last job in Germany, I received experience in manufacturing thermoplastics . . . my duties consisted of advising customers, selling, and estimating. Once the sale was completed it then became my responsibility to develop, calculate, plan the construction of the customers' installations. I thank you.—Rudolf Schafer, 2330 Chris Drive, Manhattan, Kansas.

Readers Service

Sir—We have read your Special Feature entitled, "How to Get More For Your Metalworking Dollar—Organic Finishing."

If possible, we should like to have 50 copies of this for distribution to our Circo sales engineers. We feel this is a very beneficial publication to have and that you are certainly giving your readers service.—M. Morris, Pres., Circo Equipment Co., Clark (Rahway), N. J.

▪ Copies are on the way.—Ed.

Tool Steel

Sir—Congratulations on an excellent, practical article, "How Long, How Fast to Heat Tool Steel" which appeared in your Apr. 4 and Apr. 11 issues.—T. P. Martin, Metallurgical Application Section, Materials Engineering Dept., Westinghouse Electric Co., East Pittsburgh, Pa.

Rating Electrodes

Sir—Please favor us with 10 reprints of "Rating System Simplifies Welding Electrode Selection" by O. T. Barnett in THE IRON AGE, Apr. 4 issue.

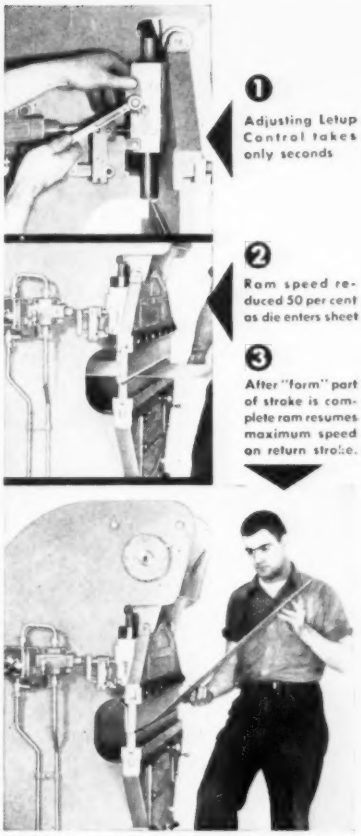
This is an excellent concise article. One of the best on the subject and is worthy of extensive study and use.—E. R. Thatcher, Standard Oil Co. of California, Los Angeles, Calif.

Plastic Foams

Sir—On p. 73 of your Feb. 14 issue is an item regarding "New Fire-Retardent Plastic Foams." Could you advise us as to the source of this material or of the information?—R. P. Courtney, New Product Engineering Dept., Bakelite Co.

▪ Write to the Englander Co., Inc., 2447 W. Roosevelt Rd., Chicago, Ill.—Ed.

"How's that for a safety toe?"


1
Adjusting Letup Control takes only seconds
2
Ram speed reduced 50 per cent as die enters sheet
3
After "form" part of stroke is complete ram resumes maximum speed on return stroke.

Letup Control on New High Speed

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★ *Eliminates whipping of material when forming*

★ *Makes for fast, safe forming of large sheets*

An adjustable flow control valve is the basic element in the Letup Control, an accessory for all Di-Acro Hydra-Power Press Brakes. Models with 3' and 4' bed and ram have Stroke Adjustment, speed from 32-80 strokes per minute, capacities of 16 and 18 gauge mild steel. These and other *features peculiar to hydraulic press brakes* spell out *Efficient, Safe* operation for a rapidly growing list of satisfied customers.

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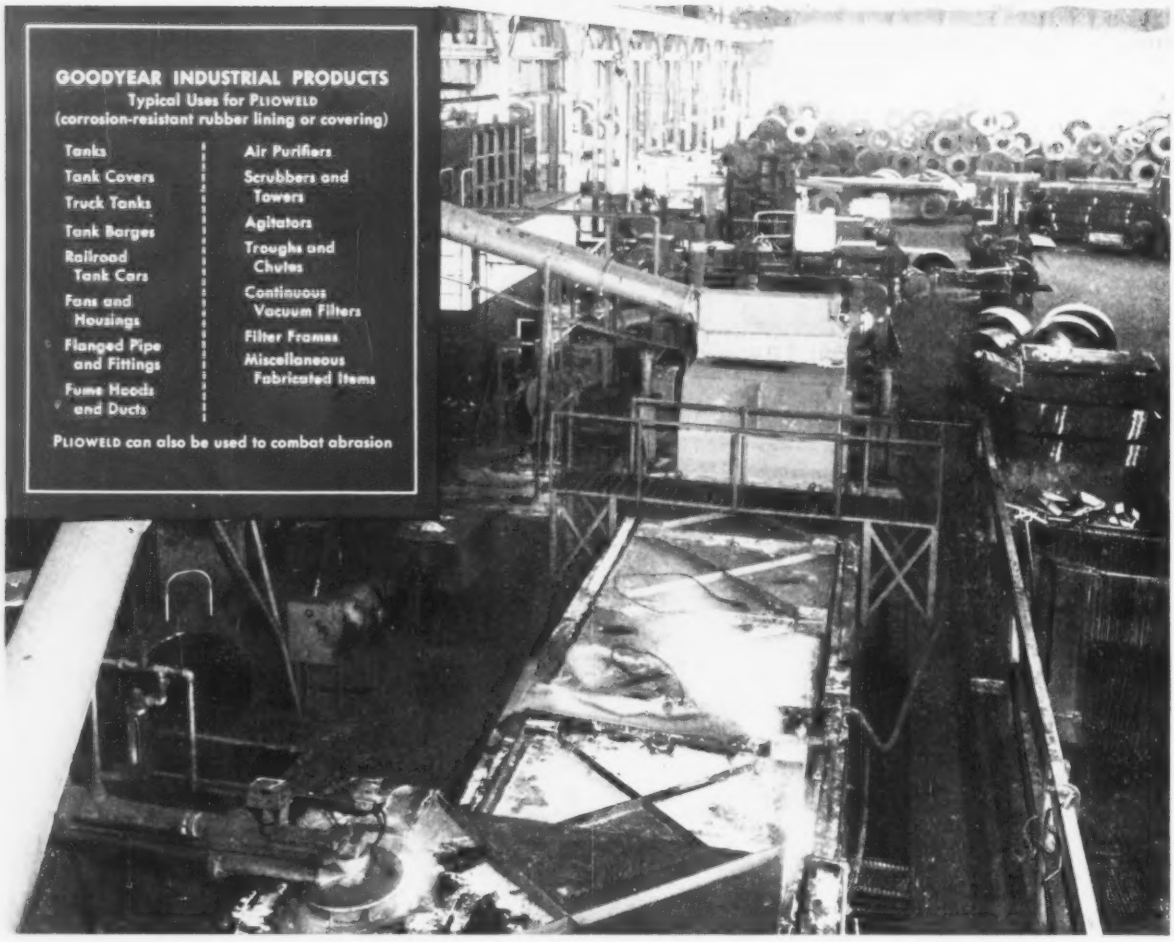


These rubber-lined tanks pickle with an underwater flame

A UNIQUE new way to heat pickling tanks—with an open flame actually submerged in the pickling solution itself—promised important new economies at this Midwestern steel plant. But they were solidly sold on rubber-lined tank advantages. And in such tanks, the new system had been tried at other plants—and had failed.

Then they called in the G.T.M.—Goodyear Technical Man—and gave him the problem. After careful study, he and his colleagues designed and engineered tanks that make the most moneysaving use of underwater firing. Key to their success was the use of PLIOWELD Tank Linings—especially compounded to stand up under the concentrated acids and high temperatures.

In just over a year, *these tanks processed 1,000,000 tons of steel—are still in perfect condition—have brought the company important savings.* And that's just one more example of the way the G.T.M. provides effective answers to vital production problems—with extra-quality products. To cash in on this unique ability, contact him by writing: Goodyear, Industrial Products Division, Akron 16, Ohio.

PLIOWELD TANK LININGS by

GOODYEAR

THE GREATEST NAME IN RUBBER

Plioweld—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

Report on Labor

There's nothing like getting the story straight from the horse's mouth. That's why the editors, when they decided to do a piece on labor relations, went to the folks who live with the problem day in and day out—metalworking management.

So to some 2000-odd metalworking executives went a questionnaire aimed at learning the answer to a problem that bothers all management at one time or another: How do you build good labor relations?

Labor Handbook—The response was terrific. Management not only answered our questions, it let its

hair down to tell us just what it considers important to good employer-employee relations. The answers add up to a practical handbook on how to get along with your workers.

And if you've ever wondered whether management is doing a good job in labor relations, forget it! An overwhelming majority of the companies queried have adopted policies the experts say are necessary to amicable conditions around the shop.

Where To Look—You'll find the full story in another IRON AGE Survey Report To Management, starting on page 97.

Absenteeism

No editorial comment is necessary in passing on to you this sign used by a big motel to keep its employees on the job:

YOU ARX IMPORTANT

Whxn you arx txmptxd to takx a day off without notifying your managxr, and you think that thx absxncx of onx pxrson won't makx too much diffxrxncx, you placx your managxr in thx samx position as a fxllow trying to typx with onx kxy missing. Hx can makx substitutions just as wx havx donx, but thx rxsult is nxvxr thx samx as whxn hx's working with thx right pxoplx on thx right jobs.

With compliments to The Ullman Organization's Executives' Digest.

Puzzlers

. . . and some more discerning people who don't believe that peacocks can lay eggs: Charlsie, Dale and Louie, General Steel Castings; N. J. Deguise, Ford Motor Co.; Maynard Kully, Kully Iron and Metal Co.; Harry Rupp, The Service Iron and Steel Co.; Norma J. Schweig; L. M. Worth; Joe Scott; N. Tracy Walker, Illinois Pure Aluminum Co.; Wm. W. Holloway, Wheeling Steel Corp.

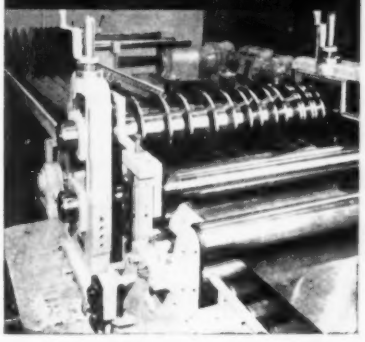
"Cyclosteel"

Last week you may have read our big buildup on a new steelmaking process, then turned to the appointed page only to find another story—all about auto parts makers.

We're sure you liked that story too, but we're sorry for the confusion.

But this week, if you'll turn to page 129, you'll find the story on "Cyclosteel." It's the complete treatment on the new process.

YODER SLITTING LINES



PAY BIG DIVIDENDS WORKING ONLY ONE DAY PER WEEK!

In one plant, two Yoder tube mills and about 50 punch presses are being supplied with slit strands by one Yoder Slitting Line operated an average of only *seven hours per week.*

In another plant, a Yoder slitting line, *operated from six to eight hours per week,* is supplying two intermittently operated roll forming machines with total requirements averaging 100,000 feet per week.

These typical examples demonstrate, first, the big potential output of a relatively small, inexpensive Yoder standardized Slitting Line and, secondly, its big profitability. Assume production of only 35 tons of slit strands per 8 hour shift, one day per week, and the total per year would be 1750 tons. Estimating the saving in slitting cost at only one-half cent per lb., the total annual saving would be $17,500.00.

Besides the big convenience of doing your own slitting, such savings will often repay the investment in a few months.

The Yoder Slitter Book **is a comprehensive treatise on slitter operation and economics, with time studies, cost analyses and other useful data. It is yours for the asking.**

THE YODER COMPANY
5510 Walworth Avenue • Cleveland 2, Ohio, U. S. A.

ENGINEERING YODER MANUFACTURING SLITTING LINES

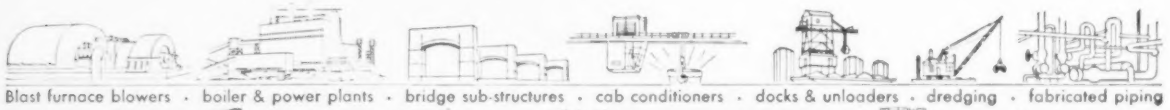
Why only ORE BRIDGES at McLouth's Trenton Mill?

At some steel plants the unloading, stocking and reclaiming of blast furnace materials are divided into separate operations. Two different machines, unloaders and bridges, work together economically to handle large tonnages.

This is not always the case. A plant that has only a few furnaces can realize substantial savings by building a dual-purpose machine to do the entire task. That's what McLouth did. At their Trenton, Michigan, mill these two modern Dravo bridges perform all functions —unloading, stocking and reclaiming ore and limestone.

Practical engineering assistance is available to help you solve problems or reduce costs in bulk materials handling or in any of the fields listed below. Write DRAVO CORPORATION, PITTSBURGH 25, PENNSYLVANIA.

DRAVO
CORPORATION



Blast furnace blowers · boiler & power plants · bridge sub-structures · cab conditioners · docks & unloaders · dredging · fabricated piping

foundations · gantry & floating cranes · gas & oil pumping stations · locks and dams · ore & coal bridges · process equipment · pumphouses & intakes

river sand and gravel · sintering plants · slopes, shafts, tunnels · space heaters · steel grating · towboats, barges, river transportation

EXHIBITS, MEETINGS

Western Plant Maintenance & Engineering Show — June 11-13, San Francisco. (Clapp & Poliak, 681 Market St., San Francisco).

Packaging & Handling Show—Oct. 28-31, Atlantic City. (SIPMHE, One Gateway Center, Pittsburgh 22).

Metal Show — Nov. 2-8, Chicago. (American Society for Metals, 7301 Euclid Ave., Cleveland 3).

MAY

American Institute of Steel Construction — Annual national engineering conference, May 27-28, Edgewater Beach Hotel, Chicago. Society headquarters, 101 Park Ave., New York.

Institute of Mining and Metallurgical Engineers — Southern Calif. Section—Regional reactive metals conference, May 28-29, Ambassador Hotel, Los Angeles. Society headquarters, 29 W. 39th St., New York.

JUNE

Society of Automotive Engineers—Summer meeting on survey vehicle performance and current European design, June 2-7, Chalfonte-Haddon Hall, Atlantic City. Society headquarters, 485 Lexington Ave., New York.

Institute of Radio Engineers—National symposium on production techniques, June 6-7, Hotel Willard, Washington, D. C. Information: 609 Monticello Dr., Falls Church, Va.

Manufacturing Chemists' Assn.—Annual meeting, June 6-8, The Greenbrier, White Sulphur Springs, W. Va. Society headquarters, 1625 Eye St., N. W., Washington 6, D. C.

The American Society of Mechanical Engineers—Semi-annual meeting, June 9-13, Sheraton-Palace,

Continued on P. 16

WHOOSH!
NO MORE FIRE
Point horn, pull trigger, fire's out! That's all it takes to knock out deadly fire with instant-action Kidde dry chemical portable extinguishers! So easy to use, even inexperienced operators get perfect fire-fighting results. Kidde's patented diffuser horn spreads dry chemical powder over wider area for greater fire-killing power. Trigger-release means faster action, feels more natural in the hand. Pick the Kidde dry chemical portable to fit your needs: 5, 10 lb. pressurized (recharged at any commercial air pump), 20, 30 lb. cartridge operated. For more information on dry chemical, carbon dioxide and wet chemical extinguishers, write today for Kidde's P-8 catalog and name of nearest distributor.
Kidde
Walter Kidde & Company, Inc.
549 Main St., Belleville 9, N. J.
Walter Kidde & Company of Canada Ltd.
Montreal — Toronto

Does Your Competition Make a Better Product with HIGH VACUUM

If you feel the sharp edge of competition slicing away at some of your best customers for your metals or metal products, perhaps high vacuum is your answer. For nothing improves the finish, increases the strength, and extends the life of metals more than vacuum processing. It can cut your costs, too.

You can advance your vacuum metallurgical research and quality control program by 17 years . . . that's how long we have been in the business of making high vacuum equipment. Our broad experience will help you decide now how vacuum metallurgy can improve your product. Weigh the results before making any investment.

Why wait until competition starts stealing your market before you find out whether vacuum metallurgy can help you? Write us now.

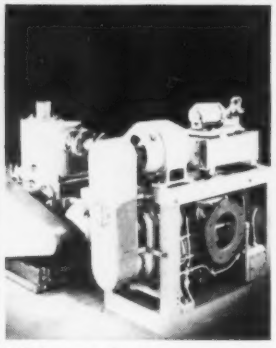
Reliable equipment for all your high vacuum needs

Cut pumping costs with less maintenance and greater dependability. Stainless body and non-corrosive parts facilitate cleaning and prevent corrosion. Complete size range from 1" to 16".

Write for bulletin No. DP-3.

Rugged new vacuum gauge with high accuracy over unusually wide range of 0.0001 — 1000 mm Hg. Thermocouple, Pirani, and hot wire ionization gauges available.

Write for bulletin No. G-3.

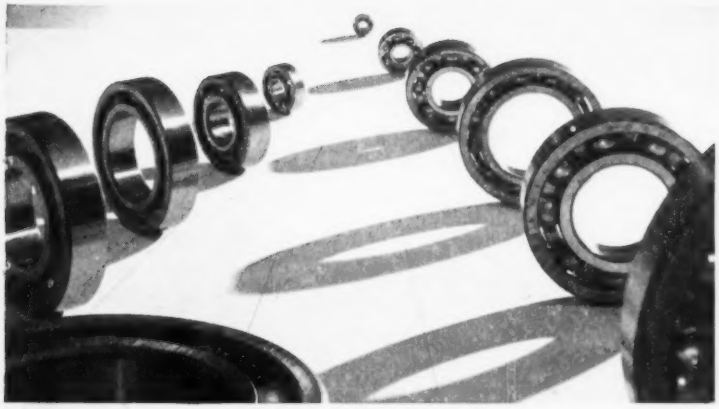


High speed vacuum pumping throughout entire micron range with NRC mechanical booster pumps. Especially suited for vacuum metallurgy capacities available from 1000 to 12,000 CFM.

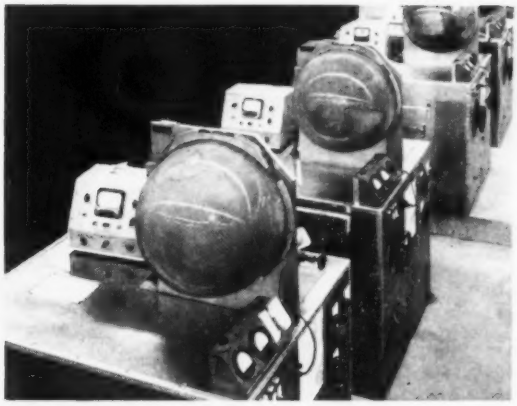
Write for bulletin No. MB-1.

Gas content of metals determined quickly and accurately with NRC gas analyzers. Measure content of hydrogen, oxygen and nitrogen as low as 1 part per million.

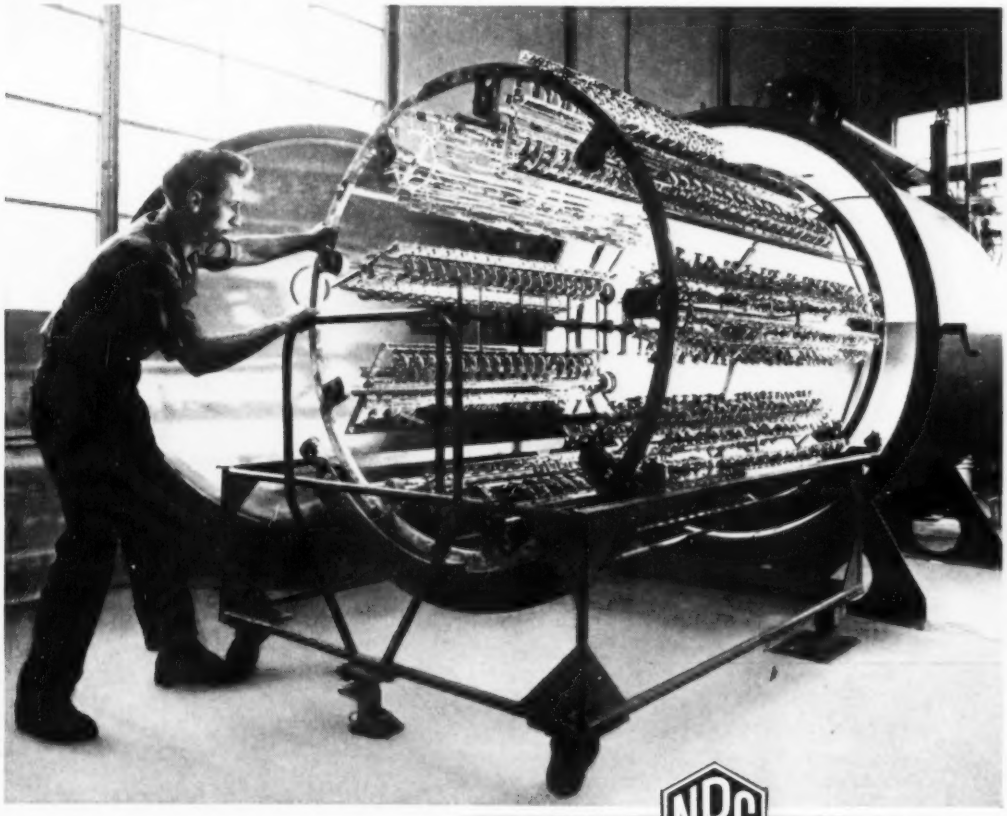
Write for bulletin No. VA-2.



Bearing life increased 600% at high temperatures and race rejects cut 90% when made of metals melted in NRC vacuum furnaces. Freedom from inclusions makes micro-finishing economical.



Get started easily with your metals research program. Units available for research, developmental or production. Choose from standard arc, resistance, or induction heated furnaces with capacities from 2 lbs. to 5,000 lbs.



Cut finishing costs as much as 75% and add sales appeal, too! Sparkling, high quality metallic finishes can be produced in a wide range of colors. Applicable to metal, plastic, wood, glass, and other materials. Write today for bulletin C3.

NRC

EQUIPMENT CORPORATION

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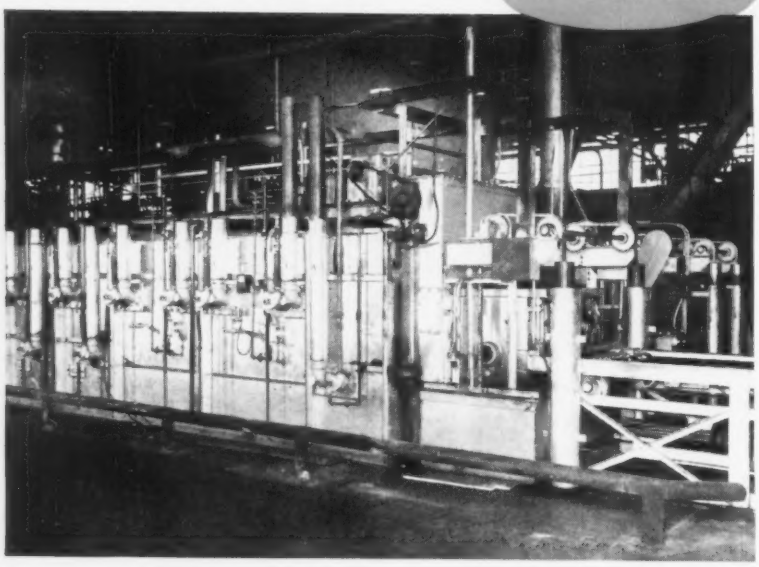
BLAZING THE HEAT TREAT TRAIL WITH HOLCROFT



LET'S TALK ABOUT

PRODUCTION DEMANDS

High production demands can be met only when every piece of equipment in the plant is geared to its job. In many plants, the bottleneck is heat treating because furnaces which were modern five years ago are virtually obsolete. These units must be replaced, redesigned, or added to.

Automatic handling of materials is one answer, of course. Today, some heat treating systems are tied right into production lines. In other plants, work is centralized with automated equipment eliminating most stock handling. A single operator loads green work and removes finished parts.

Some furnaces accomplish dual jobs. A recent Holcroft installation was built to temper two entirely different classes of carburized parts. The furnace was designed with a double chamber with each side operating at the required temperature. Flags, placed on the trays requiring low temperature tempering, keyed the line so that the work automatically positioned itself in front of the correct chamber. Another installation featured a double deck furnace—designed so that two entirely different heat treat processes were accomplished in space where but a single furnace would normally go.

And so it goes: a little idea to save a minute or to eliminate a manual operation—a brainstorm that combines two or more furnaces or steps up furnace capacity. This Holcroft concept can help you produce more for less and with better quality. Better write today.

6030

HOLCROFT AND COMPANY

6545 EPWORTH BOULEVARD • DETROIT 10, MICHIGAN

PRODUCTION HEAT TREAT FURNACES FOR EVERY PURPOSE

CHICAGO, ILL. • CLEVELAND, OHIO • HARTFORD, CONN. • HOUSTON, TEXAS • PHILA., PA.

CANADA: Walker Metal Products, Ltd., Windsor, Ontario

EXHIBITS, MEETINGS

Continued from P. 13

San Francisco, Calif. Society headquarters, 29 W 39th St., N. Y.

Malleable Founders' Society—Annual meeting, June 13-14, The Broadmoor, Colorado Springs, Colo. Society headquarters, 1800 Union Commerce Bldg., Cleveland.

Instrument Society of America — National symposium on instrumental methods of analysis, June 13-15, University of Chicago. Society headquarters, 313 Sixth Ave., Pittsburgh.

Pressed Metal Institute — Annual national sales conference for the metal stamping industry, June 14, Hotel Carter, Cleveland. Society headquarters, 3673 Lee Rd., Cleveland.

Assn. of Steel Distributors, Inc.—Steel distribution seminar, June 14-17, Michigan State University, Lansing, Mich. Society headquarters, 29 Broadway, New York.

American Society for Testing Materials — Annual meeting with sessions on varied fields of materials technology, June 17-21, Chalfonte-Haddon Hall, Atlantic City. Society headquarters, 1916 Race St., Philadelphia.

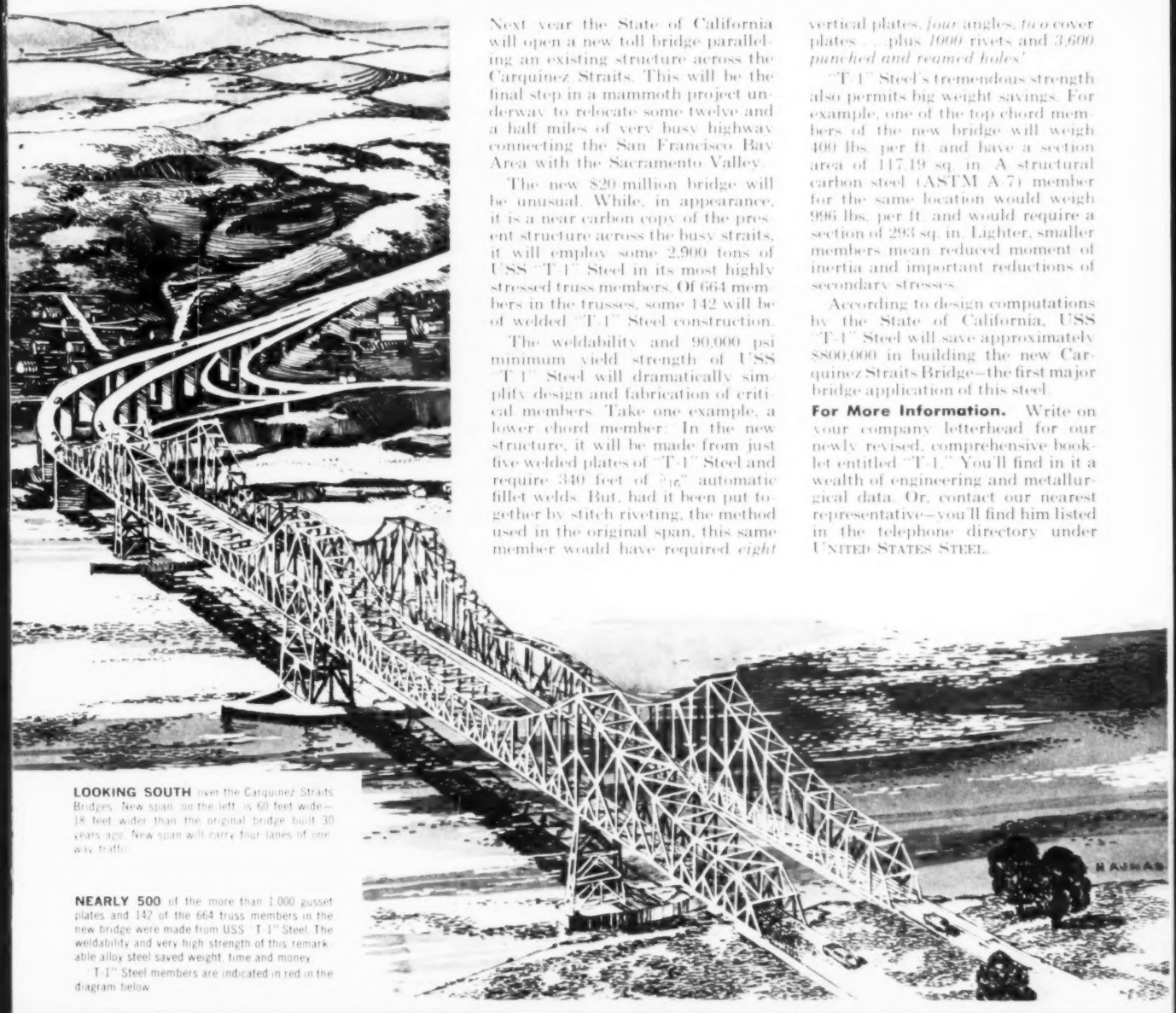
American Institute of Chemical Engineers — 50th anniversary meeting, June 22-27, Bellevue-Stratford Hotel, Philadelphia. Society headquarters, 25 W. 45th St., New York.

Alloy Casting Institute — Annual meeting, June 23-25, The Homestead, Hot Springs, Va. Society headquarters, 32 Third Ave., Mineola, N. Y.

Wire Reinforcement Institute—Annual spring meeting, June 24-25, The Greenbrier, White Sulphur Springs, W. Va. Society headquarters, 1049 National Press Bldg., Washington, D. C.

Concrete Reinforcing Steel Institute—Annual meeting, June 24-29, The Greenbrier, White Sulphur Springs, W. Va. Society headquarters, 38 S. Dearborn St., Chicago.

USS "T-1" STEEL WILL SAVE $800,000 IN FIRST MAJOR BRIDGE APPLICATION



LOOKING SOUTH over the Carquinez Straits Bridges. New span, on the left, is 60 feet wide—18 feet wider than the original bridge built 30 years ago. New span will carry four lanes of one-way traffic.

NEARLY 500 of the more than 1,000 gusset plates and 142 of the 664 truss members in the new bridge were made from USS "T-1" Steel. The weldability and very high strength of this remarkable alloy steel saved weight, time and money.

"T-1" Steel members are indicated in red in the diagram below.

Next year the State of California will open a new toll bridge paralleling an existing structure across the Carquinez Straits. This will be the final step in a mammoth project underway to relocate some twelve and a half miles of very busy highway connecting the San Francisco Bay Area with the Sacramento Valley.

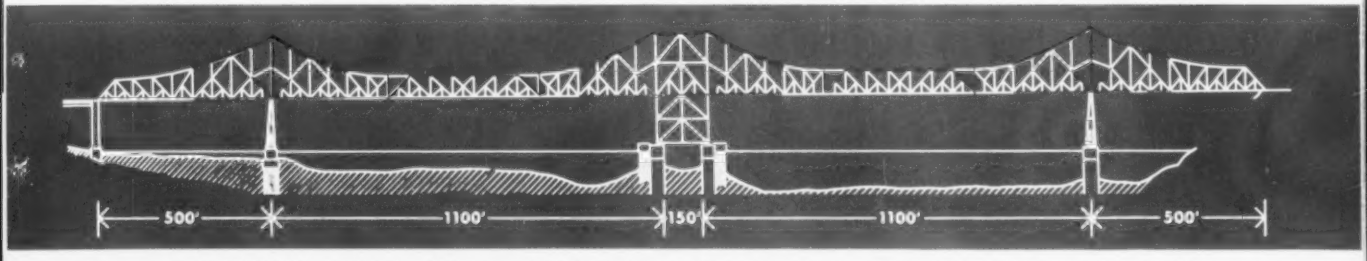
The new $20-million bridge will be unusual. While, in appearance, it is a near carbon copy of the present structure across the busy straits, it will employ some 2,900 tons of USS "T-1" Steel in its most highly stressed truss members. Of 664 members in the trusses, some 142 will be of welded "T-1" Steel construction.

The weldability and 90,000 psi minimum yield strength of USS "T-1" Steel will dramatically simplify design and fabrication of critical members. Take one example, a lower chord member: In the new structure, it will be made from just five welded plates of "T-1" Steel and require 340 feet of $\frac{9}{16}$" automatic fillet welds. But, had it been put together by stitch riveting, the method used in the original span, this same member would have required *eight* vertical plates, *four* angles, *two* cover plates . . . plus *1000* rivets and *3,600 punched and reamed holes!*

"T-1" Steel's tremendous strength also permits big weight savings. For example, one of the top chord members of the new bridge will weigh 400 lbs. per ft. and have a section area of 117.19 sq. in. A structural carbon steel (ASTM A-7) member for the same location would weigh 996 lbs. per ft. and would require a section of 293 sq. in. Lighter, smaller members mean reduced moment of inertia and important reductions of secondary stresses.

According to design computations by the State of California, USS "T-1" Steel will save approximately $800,000 in building the new Carquinez Straits Bridge—the first major bridge application of this steel.

For More Information. Write on your company letterhead for our newly revised, comprehensive booklet entitled "T-1." You'll find in it a wealth of engineering and metallurgical data. Or, contact our nearest representative—you'll find him listed in the telephone directory under UNITED STATES STEEL.

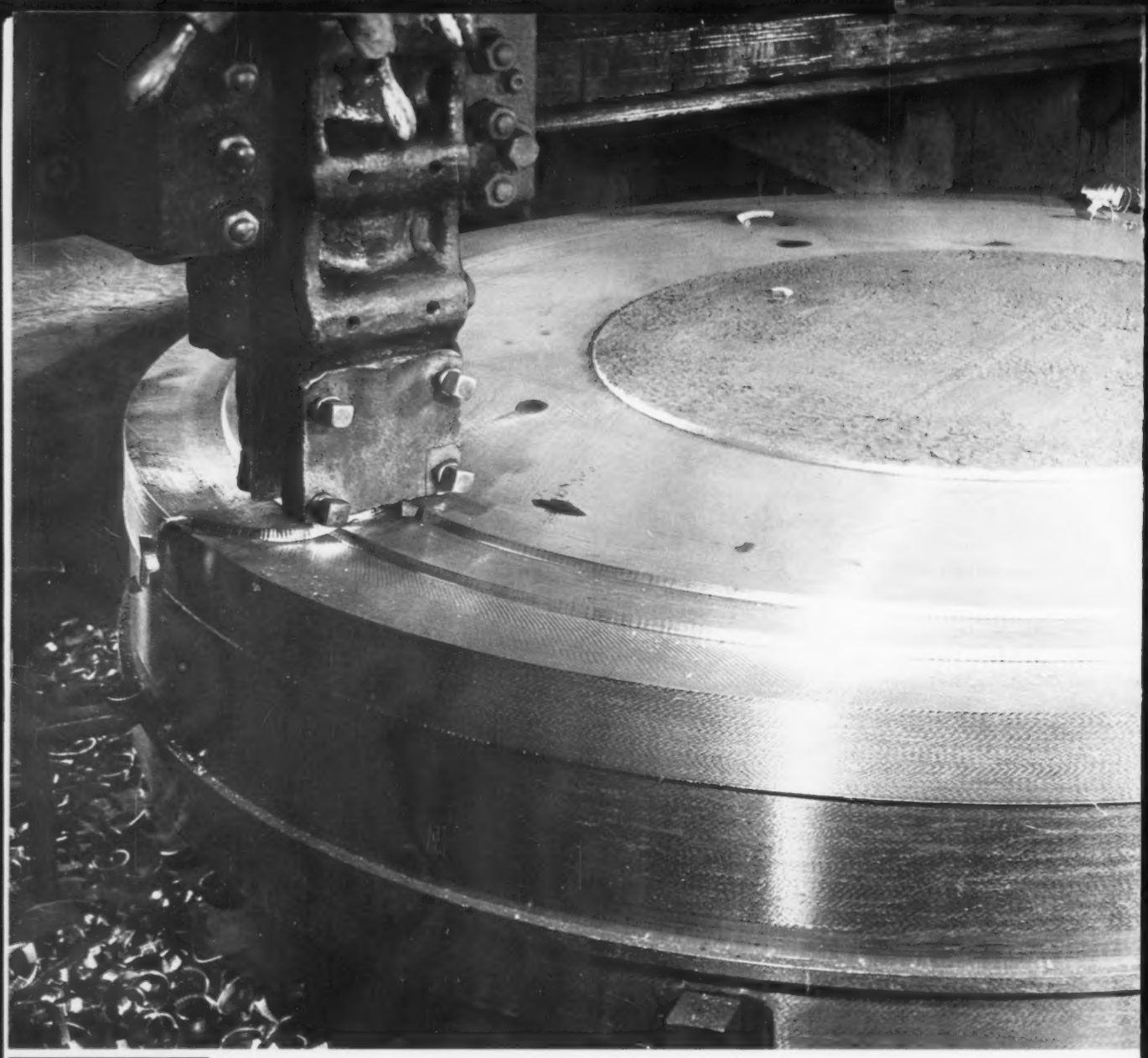


UNITED STATES STEEL CORPORATION, PITTSBURGH • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.
UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS, COAST-TO-COAST • UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS "T-1" CONSTRUCTIONAL ALLOY STEEL

"USS" and "T-1" are registered trademarks.

UNITED STATES STEEL



"A good inspector must have

says **Thomas A. Pugh**
USS General Supervisor, Inspection

ANY MANUFACTURER worth his salt will admit that a tight inspection system is based on "the critical eyes" of his inspectors. This is especially true when you're dealing with unusual forgings that are worth many thousands of dollars.

Forgings like the nuclear reactor disc in the picture are particularly susceptible to trouble. It was forged from a chromium-nickel stainless steel ingot—a critical operation, since stainless has a very narrow temperature range in which it can be forged. To control this, a metallurgical observer stayed with the piece *every minute* it was being forged and took frequent temperature readings.

After the delicate heat-treating process, physical test bars were drilled out of the piece with a trepanning tool and subjected to accurate tensile and grain size tests. For hours, an inspector checked its soundness with a sonic crystal. Finally, we were sure that the piece was worthy to be called a USS Quality Forging.

Depending on the application and the specifications, some USS Quality Forgings require a great many more inspection steps which are sometimes spread over many weeks of shop processing. There are eleven forgings inspectors, reporting to three foremen, and they all work under the careful eye of Thomas Pugh. That's his picture on the left.

a critical eye,"

Mr. Pugh is in his 32nd year with United States Steel. He spent 30 of them as an inspector—the last 16 exclusively on forgings. Few men *anywhere* have his deep knowledge of inspection techniques and equipment, and how to use them to check large section forgings designed for critical, high-stress applications. Our faith in him is obvious: he has the authority to reject any USS Forging that does not meet our standards of quality.

In every step of the manufacturing operation—from melt shop to shipping floor—men like Thomas Pugh keep close watch over your USS Quality Forging, and they have the equipment to back them up. We'd appreciate your inquiries or requests for our free 32-page booklet on USS Quality Forgings. Just write United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.

USS

QUALITY

FORGINGS

heavy machinery parts . . carbon, alloy, stainless

forged steel rolls and back-up roll sleeves

electrical and water wheel shafts

specialty forgings of all types

UNITED STATES STEEL

To meet rugged service conditions– a refractory concrete dome made with ATLAS LUMNITE* CEMENT

Three-year service life was obtained at this plant by a previous furnace dome made with the same materials. This 17' diameter hardening and annealing furnace inner dome is made with a castable refractory containing Atlas Lumnite cement—A.P. Green "Kast-Set." Heat passes through 289 easily formed 5" round holes, heating concrete on both sides. Installed by Lindberg Combustion, Chicago, Ill., for the Englander Co., Inc., Birmingham, Ala.

- Lumnite-made refractory concrete resists extreme variations in temperature and thermal shock due to rapid heating and cooling.
- Durability under severe operating conditions is assured.
- Placement is fast and easy — service strength is reached within 24 hours.

For maximum convenience, use Lumnite-made castables. These are pre-mixed, ready for use, and are made by leading manufacturers of refractories. For more information, write: Universal Atlas, 100 Park Avenue, New York 17, N. Y.

UNIVERSAL ATLAS CEMENTS

USS

* "LUMNITE" is the registered trademark of the calcium-aluminate cement manufactured by Universal Atlas Cement Company.

L-145

UNIVERSAL ATLAS CEMENT COMPANY—member of the industrial family that serves the nation—**UNITED STATES STEEL**

OFFICES: *Albany · Birmingham · Boston · Chicago · Dayton · Kansas City · Milwaukee · Minneapolis · New York · Philadelphia · Pittsburgh · St. Louis · Waco*

B-RIGHT-ON®

SOCKET SCREW PRODUCTS

always measure up!

QUALITY B-RIGHT-ON PRODUCTS ®

Socket screw users who want *what* they want *when* they want it know it pays to specify B-RIGHT-ON! Brighton Socket Screw Products *always* measure up.

Standard or special, Brighton Screws must meet and pass factory standards that are higher even than those specified by the ultimate user of the screws. Rigid control, from initial steel selection to final packaging, certifies every screw as B-RIGHT-ON quality.

Selected mill supply houses, Brighton distributors, complete the control chain, assure the user of service and delivery as dependable as the screws . . . B-RIGHT-ON service.

Write for descriptive literature . . . see how

YOU CAN DO BETTER WITH B-RIGHT-ON.

THE BRIGHTON SCREW & MANUFACTURING CO.

1829 READING ROAD CINCINNATI 2, OHIO

You said it, Princess Wenatchee! This race looks like the KENTUCKY "500" with Chief Keokuk left at the starting line, making like the Last of the Mohicans, while Junior's backers are getting ready with their best hurrahs. They know a sure winner!

In the race for lower costs and higher quality, many foundries and steel plants have spotted the standout favorite—Keokuk Silvery Pig Iron—the superior form of silicon introduction. Pig for pig . . . car for car, this winner's uniformity never varies! Handle by magnet, charge by weight or count the pigs for equal accuracy. Aluminum producers, Keokuk Silicon Metal is a sure winner.

KEOKUK ELECTRO-METALS COMPANY
Keokuk, Iowa
Wenatchee Division, Wenatchee, Washington

When you think of SILICON, think of KEOKUK!

KEOKUK SILVERY PIG IRON

Keokuk Silvery Pig—the superior form of silicon introduction for foundries and steel plants—is available in 60 and 30 lb. pigs and 12½ lb. piglets in standard analysis or alloyed to your specifications. Silicon metal and ferrosilicon are supplied in standard sizes and analyses.

SALES AGENT: MILLER AND COMPANY
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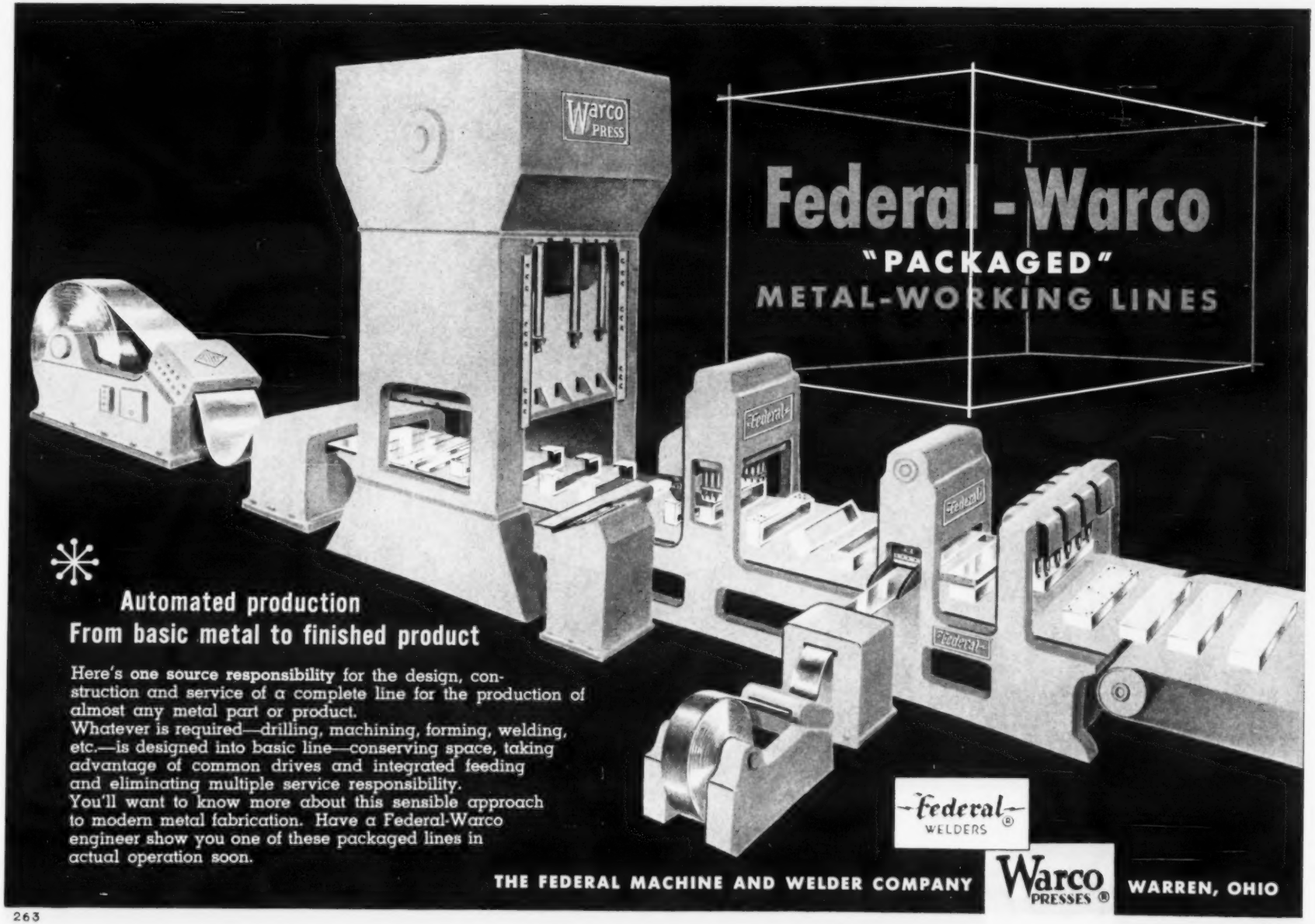
3504 Carew Tower, Cincinnati 2, Ohio
8230 Forsyth Blvd., St. Louis 24, Missouri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"PACKAGED"
METAL-WORKING LINES
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Automated production
From basic metal to finished product
Here's one source responsibility for the design, construction and service of a complete line for the production of almost any metal part or product.
Whatever is required—drilling, machining, forming, welding, etc.—is designed into basic line—conserving space, taking advantage of common drives and integrated feeding and eliminating multiple service responsibility.
You'll want to know more about this sensible approach to modern metal fabrication. Have a Federal-Warco engineer show you one of these packaged lines in actual operation soon.
Federal WELDERS
THE FEDERAL MACHINE AND WELDER COMPANY
Warco PRESSES
WARREN, OHIO

263

Represented on the West Coast by Cassimus Company, Los Angeles, San Francisco and Seattle

"Allis-Chalmers fork trucks are tougher and require less maintenance"

— says Chief Mechanic

"I think one reason the Allis-Chalmers trucks have outperformed the others is because they are easier to clean and service," continues Milt, the chief mechanic at Neenah Foundry Co., Neenah, Wisconsin. "I like the overhead valves and wet cylinder sleeves. I'm glad to see that they are replacing the old trucks with Allis-Chalmers trucks. This is going to make our job a lot easier."

Allis-Chalmers fork trucks *are* replacing other makes of trucks in the plant, because, according to J. P. Keating, vice-president, "On checking with operating and maintenance departments, we definitely feel your equipment is much better than competitive models. Design features, combined with the proved and dependable Allis-Chalmers engine, make this an outstanding industrial truck. We therefore recommend it without reservation."

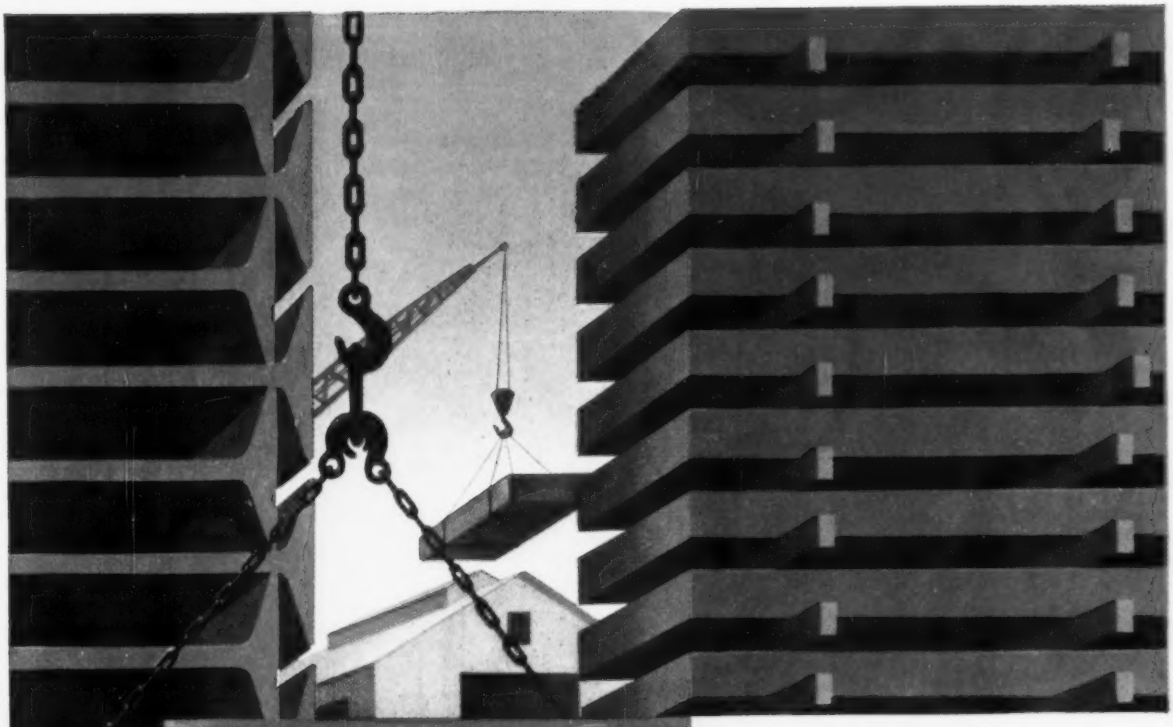
Let your Allis-Chalmers material handling dealer give you the complete story on why owners, operators, servicemen — everyone likes Allis-Chalmers fork trucks. Better yet, let him demonstrate one and you'll see for yourself.

MATERIAL HANDLING DEPARTMENT, BUDA DIVISION, MILWAUKEE 1, WISCONSIN

ALLIS-CHALMERS

Mr. Gast, operator of one of the Allis-Chalmers fork trucks at the Neenah Foundry says: "This truck must have been engineered for the driver. The parking brake is the best I've ever used. The shifting is handy, it speeds up my operation . . . I like where the hydraulic controls are located."

BH-40



New Facilities to do a better job for you

During the past six months Levinson has been undergoing a major expansion program designed to meet the increasing demands of its customers for plain and fabricated steel.

New warehousing facilities have been acquired in McKees Rocks, Pa. and the company is in the process of adding new, modern equipment for cutting and fabricating. All of this adds up to an even better job for Levinson customers.

On your next order for plain or fabricated steel

just . . . Leave it to **LEVINSON**

Warehousers, fabricators, designers of steel for over half a century

the LEVINSON STEEL COMPANY

Pittsburgh 3, Pa.
Phone: HUbbard 1-3200

ONE OF A SERIES . . .

What makes Hyatts run smoother and longer?

CARBURIZED INNER RACES

From a fatigue life standpoint, the inner race is the critical member of a roller bearing, because the smaller area of contact between rollers and inner race concentrates the loads upon it. That's why HYATT goes to the added expense of *carburizing* every inner race—to assure you the performance and fitting advantages detailed at the right.

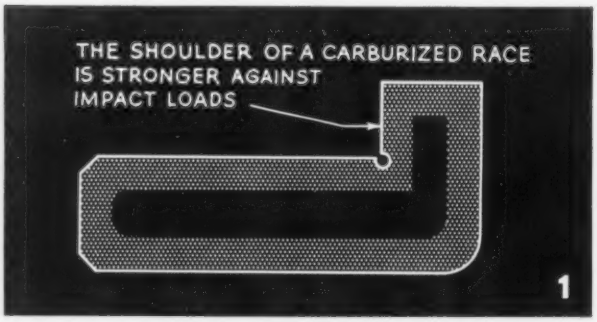
You will find full selection and application data in HYATT Catalog 150, or call your nearest HYATT Sales Engineer. Hyatt Bearings Division, General Motors Corporation, Harrison, New Jersey. Sales offices at Harrison, Pittsburgh, Detroit, Chicago and Oakland, Cal.

HEAVIER INTERFERENCE FITS

Resistance to relative movement between inner race and shaft is vital to good performance. So HYATT makes practically all inner races of carburizing type nickel alloys instead of through-hardened steel. After carburizing and heat-treating, the outer surface has the hard wear resistance so necessary for an efficient bearing. The low-carbon core remains tough and ductile to permit much heavier interference fits than are otherwise possible.

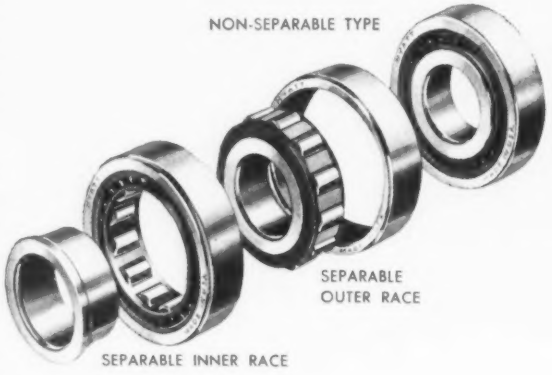
TOUGHER FLANGES, GREATER LOAD CAPACITY

Carburizing also enables HYATT to obtain substantially tougher inner race flanges. Tests show the shoulders will withstand considerably greater impact loads (Figure 1). The carburizing process has also been found to increase the load-carrying capacity of the race by building up compressive hoop stresses in its external fibres during quenching.



SIMPLER, LOWER-COST MOUNTING

Another advantage of HYATT'S heavier interference fits is the elimination of all auxiliary holding devices. When the carburized inner race is either pressed or shrunk on the shaft according to HYATT fitting recommendations, it becomes practically an integral part of the shaft itself. This permits mountings of the simplest type and lowest overall cost.



GM GENERAL MOTORS

HYATT HY-ROLL BEARINGS FOR MODERN INDUSTRY

IDEAS . . . into springs

During the thinking stage of new developments or improvements, count on our specialized experience to produce "the very idea" when springs are needed.

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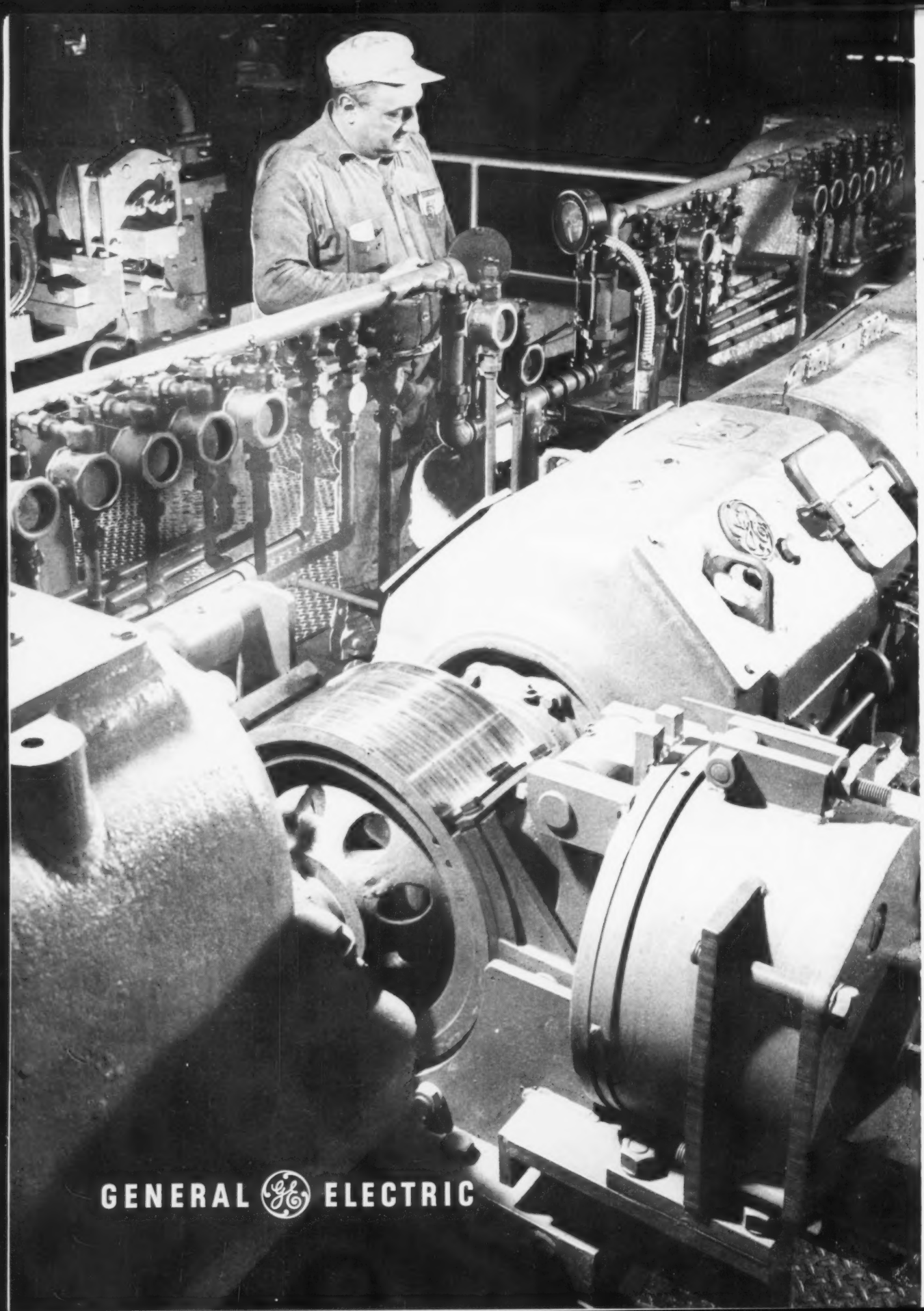
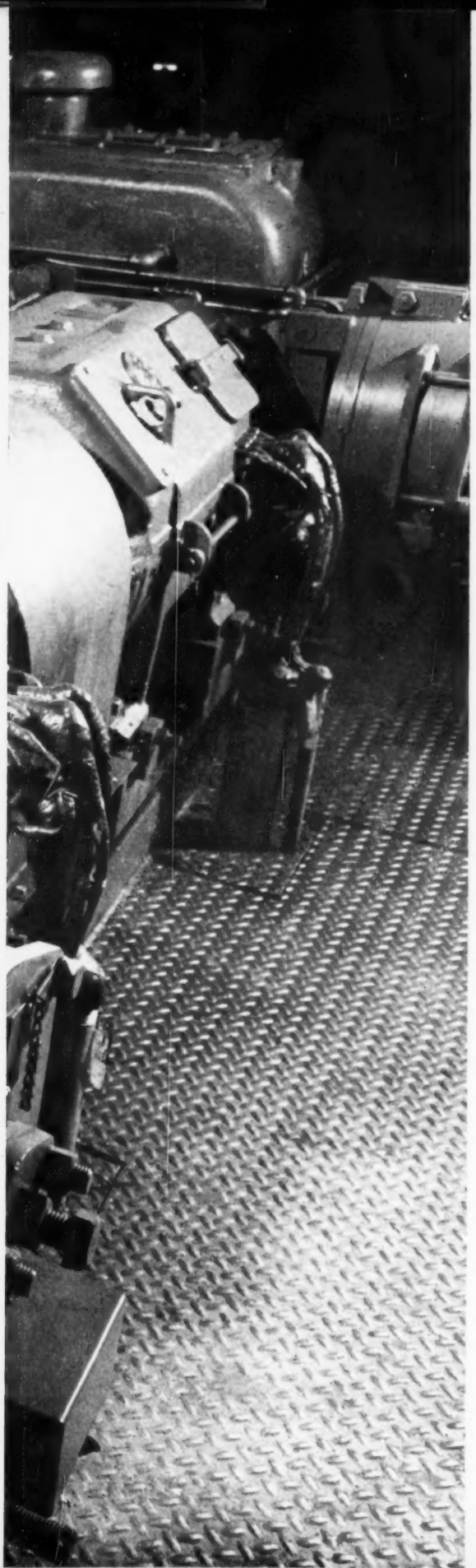

GENERAL ELECTRIC



Progress in Direct Current Drives . . .

NOW MD-600 Motors Meet AISE Standards In All Sizes

In steel mills, on cranes, on power shovels—on any application where severe operating conditions exist, General Electric's Armored Motors are on the job. *In all frame sizes*—402, 602 through 624, MD motors meet or better the high standards of the Association of Iron and Steel Engineers.

Where minutes mean money—In the process industries, any "downtime" can cause staggering losses. MD-600 motors have that *added protection* that gives steadier production—fewer unplanned shutdowns.

Class H insulated coils, standard in all MD-600 motors, give greater thermal protection, longer insulation life—an unmatched level of dependability. Insulation failure and motor roastouts have been virtually eliminated!

Specifically designed for the most rugged production applications, General Electric MD-600 motors provide high acceleration, deceleration and reversing to deliver peak horsepower faster and more efficiently. They will perform continuously under extreme strains of mechanical shock, high temperature and in the corrosive presence of dirt, steam and water.

Engineering help—If you would like to know more about the MD-600 motor line, we would be pleased to have a General Electric Industrial Specialist call on you. Or, if you prefer, we will send you copies of GEA-5654. Direct Current Motor and Generator Department, General Electric Company, Erie, Pennsylvania. 811-4

Progress Is Our Most Important Product

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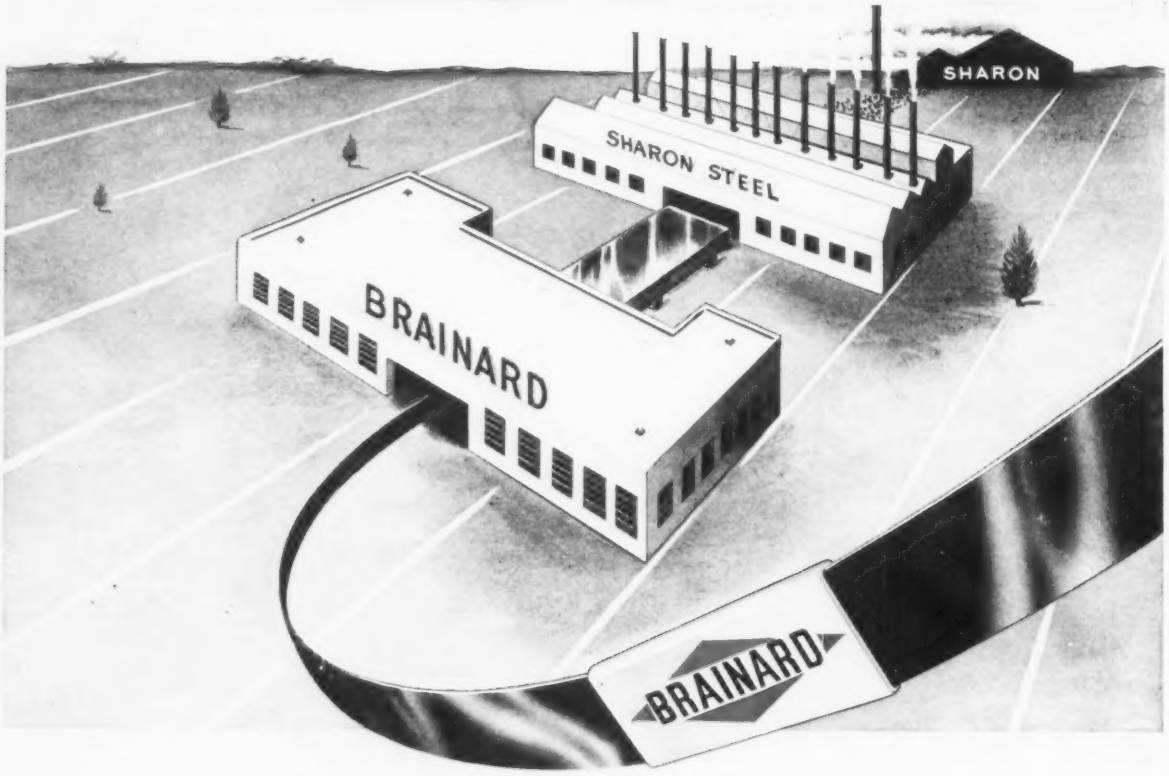
Another Plus...from Brainard



"INTEGRATION" An Extra Assurance of Quality in Brainard Steel Strapping...

The word integration has a special meaning in the industrial vocabulary. An integrated company has come to mean one that gives something extra in quality, delivery, and performance.

As a division of Sharon Steel, Brainard can be sure that the steel used for strapping has been developed to meet their own exacting standards. From mine to finished product, Brainard Steel Strapping has that extra quality that can come only from an integrated industry.

The Brainard strapping line includes over 378 items to provide you the finest modern strapping facilities. Brainard trained sales engineers are on call in every major city to help you with your strapping problems.

Brainard Steel Strapping

SHARONSTEEL

Brainard Steel Division, Sharon Steel Corporation
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CO_2 MAGS PROCESS GIVES GREATER SPEEDS AND PENETRATION

(and costs far less, too)

The Chicago Steel Tank Company, division of U. S. Industries, Inc., was faced with a problem involving thousands of 1" carbon steel plug welds in several steam jacketed vessels.

After experimenting with other methods, they found that the CO_2 MAGS process solved the problem.

This process gave increased metal deposition rates and greater penetration due to the agitating type of arc that is characteristic of CO_2 welding. At the same time, the use of CO_2 MAGS process gave increased operator flexibility, minimized the need for rework and greatly improved the appearance of the welds.

WELDING GRADE CO_2 COSTS ONLY 1½¢ PER CU. FT.

CO_2 Metal Arc Gas Shielded Welding saves approximately 7¢ on every cubic foot of gas you use. This brings the advantages of shielded gas welding to even the most limited budget applications. As Chicago Steel Tank proved to their own satisfaction, MAGS process gives welds that are equal, *or superior*, to welds made with argon or helium.

For best results with CO_2 MAGS welding, do what Chicago Steel Tank Company does . . . use RED DIAMOND Welding Grade CO_2. This CO_2 is specifically developed for gas shielded welding. Furnished in distinctively marked 50 lb. (435 cu. ft.) cylinders. See what CO_2 MAGS welding can do for you—mail the coupon below.

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for low cost inert gas arc welding of mild steel

The Aircomatic arc welding process using carbon dioxide gas as the shielding medium, means high economy and speed in certain mild steel welding applications.

Fabricators of mild steel products such as car frames, fuel tanks, water heaters, trailer frame supports and pedal levers report outstanding results and substantial savings through this new technical development.

This combination of Aircomatic equipment (manual or automatic) and CO_2 is particularly recommended for high production work where the faster welding speeds and the inexpensive shielding gas will most benefit the cost conscious user. It is an ideal process for single pass applications and multiple pass applications. Joining sections of large diameter steel pipe is but one example.

If you weld mild steel, investigate the possibilities and advantages of using the Aircomatic process in your particular operation. Complete information and literature is available. Write Airco today!

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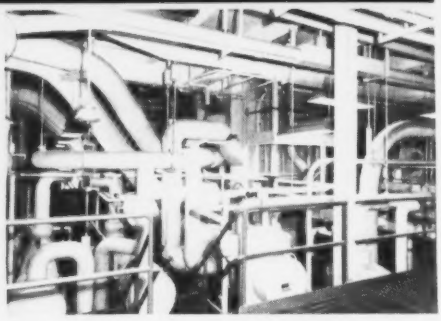

Heater piping system in this modern generating station is typical of many high temperature, high pressure systems prefabricated and erected by Blaw-Knox. Experienced piping engineers, modern shop facilities and a new Blaw-Knox digital computer method for fast, accurate calculation of piping stresses are available to you. Let us know your requirements and we'll provide the service you need. For more information, write for Bulletin No. 2443—"Piping for Industry."

Out of every 100 firms who lose their records in a fire, 43 never reopen for business. Be safe. Let a Blaw-Knox fire-protection engineer study your needs—and explain how you can pay for the system on our lease or deferred payment plan. To get more information send for Bulletin No. 2426—"Fire Can Destroy Your Business."

Blaw-Knox trapeze functional spring hanger installed in first large atomic generating station. Vital power piping system for the atomic generating unit in the Duquesne Light Company's Shippingport Station is supported by Blaw-Knox custom-engineered hangers.

Blaw-Knox makes a complete line of standard and custom-engineered pipe hangers, supports, and vibration eliminators. Each is a complete packaged unit, designed for a specific purpose and constructed to comply with the "code for pressure piping." Available in types and sizes to meet varying conditions, ready to install.

Blaw-Knox engineers, who have solved many difficult hanger and piping vibration problems, are always available to both design and make recommendations for your hanger requirements. For further information, write for Catalog No. 54.

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Complete facilities for prefabrication and erection of piping systems for all pressures and temperatures
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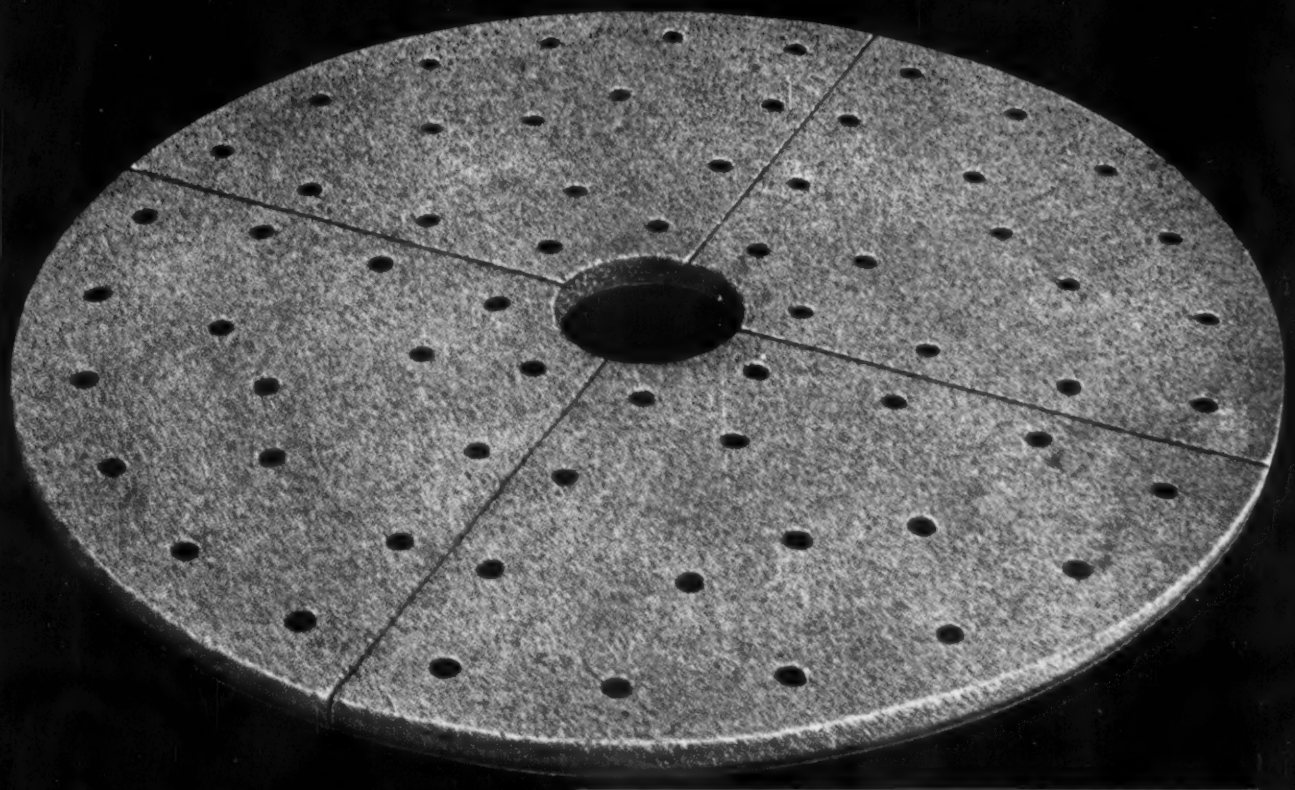
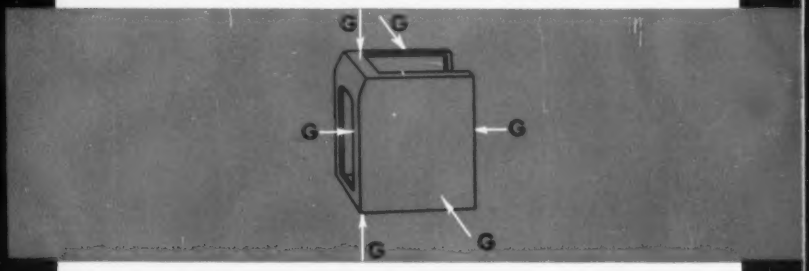
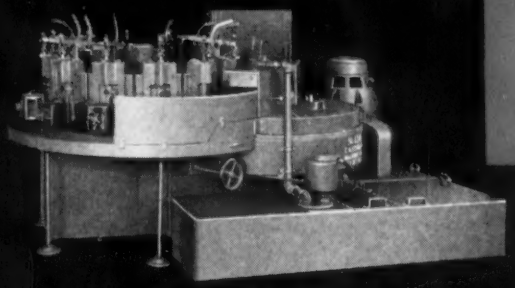
...complete line of automatic sprinkler systems for standard and special hazards

How disc life was increased from 5 days to 5 weeks



This production improvement on coin box grinding results directly from combined recommendations of *both* Gardner Machine Representative and Gardner Abrasives Specialist . . .





Gardner #124-53" horizontal disc grinder for continuous grinding of coin box surfaces.

Here's what was done:

1. Disc specification revised
2. Dressing method changed
3. Minor adjustment in fixturing

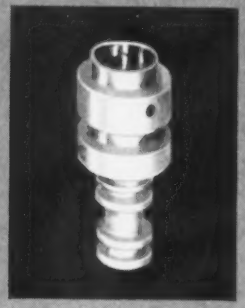
For practical solutions to your disc grinding problems call Gardner for complete service.

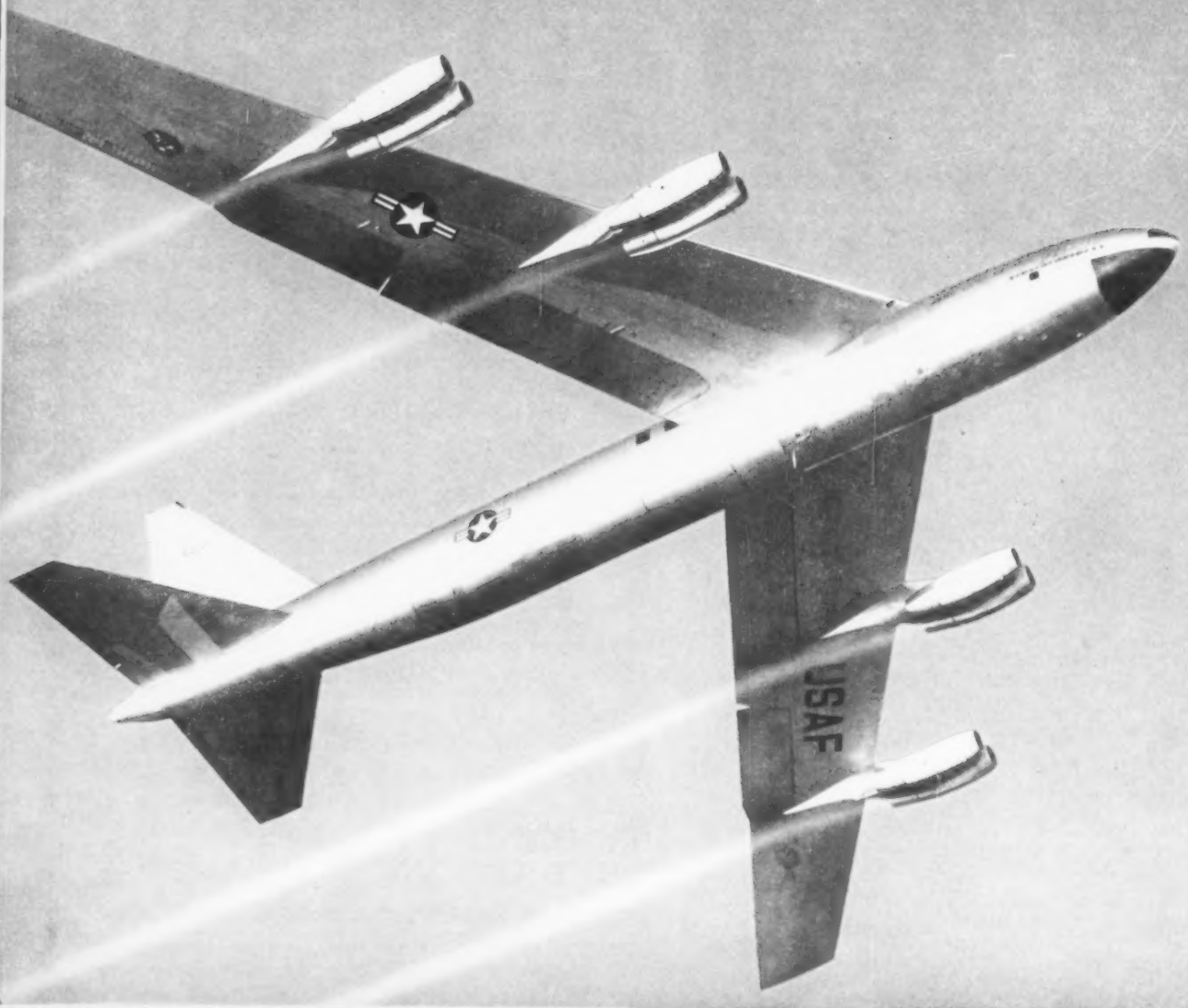
GARDNER

abrasive discs

BELOIT, WISCONSIN

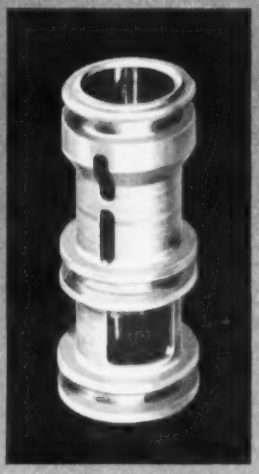
Finishes to 3 millionths





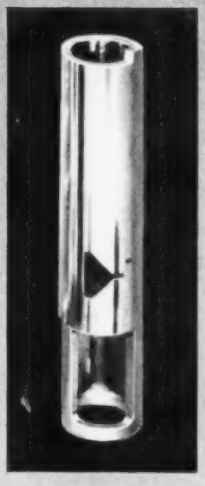
of an inch...

on these *Carpenter* Stainless parts which keep America's biggest jet bombers flying!



when you want *RESULTS...*

be guided by stainless fabricating performance on interesting jobs like these. Carpenter Stainless parts like these are used in the fuel control systems of America's newest and biggest planes such as the B-52 jet bomber shown at left. Finishes of 3 millionths of an inch are obtained in the machining of many highly critical stainless aircraft parts. In addition, the company who fabricates these parts for the airframe manufacturer is able to hold close tolerances on parts that are irregular in shape. In his own words "... we know we can rely on Carpenter Stainless to hold the dimensions to which the parts are designed."



when you want *ACTION...*

on delivery of the Carpenter Stainless you need, simply dial your nearest Carpenter Mill-Branch Warehouse, Office or Distributor. The man on the order desk is your link with large stocks of Carpenter Free-Machining Stainless Steels, Matched Tool and Die Steels, or Special-Purpose Alloy grades. And large local stocks are backed by Carpenter's nationwide network of Mill-Branch Warehouses. These warehouses are linked by direct, private wire service as further assurance that the specific grade you want is available *when* you want it. Call the Carpenter location nearest your plant for service you can *rely* upon.

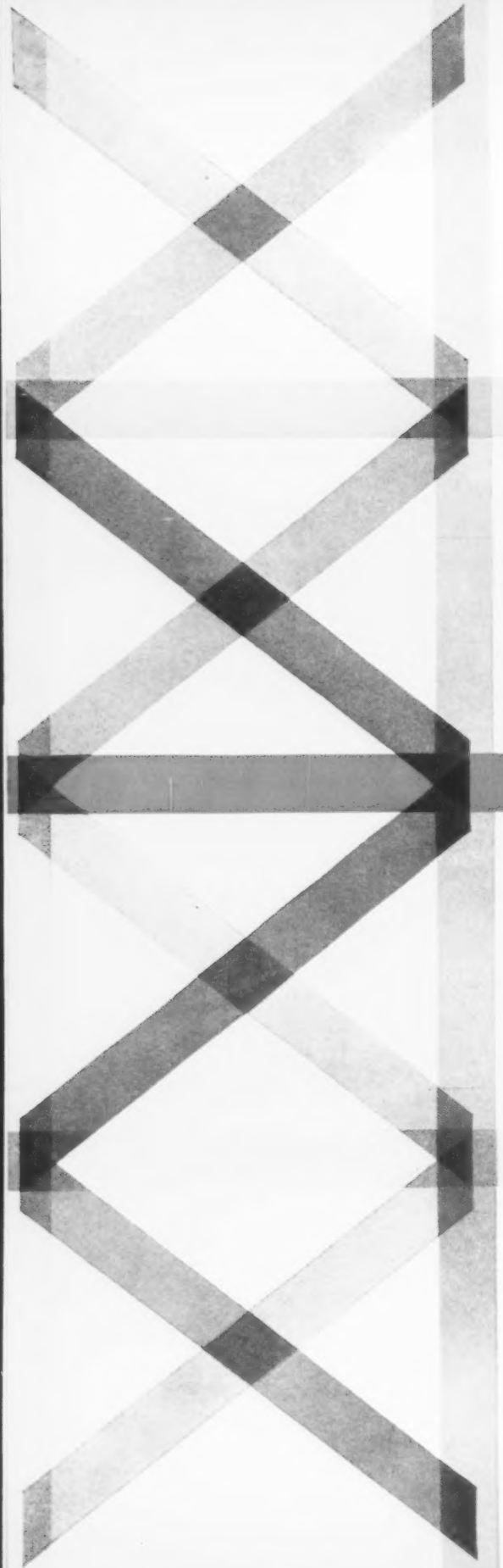
Carpenter

Free-Machining Stainless Steels

The Carpenter Steel Company, 121 W. Bern St., Reading, Pa.

Export Dept.: The Carpenter Steel Co., Port Washington, N. Y.—"CARSTEELCO"

Mill Branch Warehouses, Offices and Distributors in Principal U. S. Cities



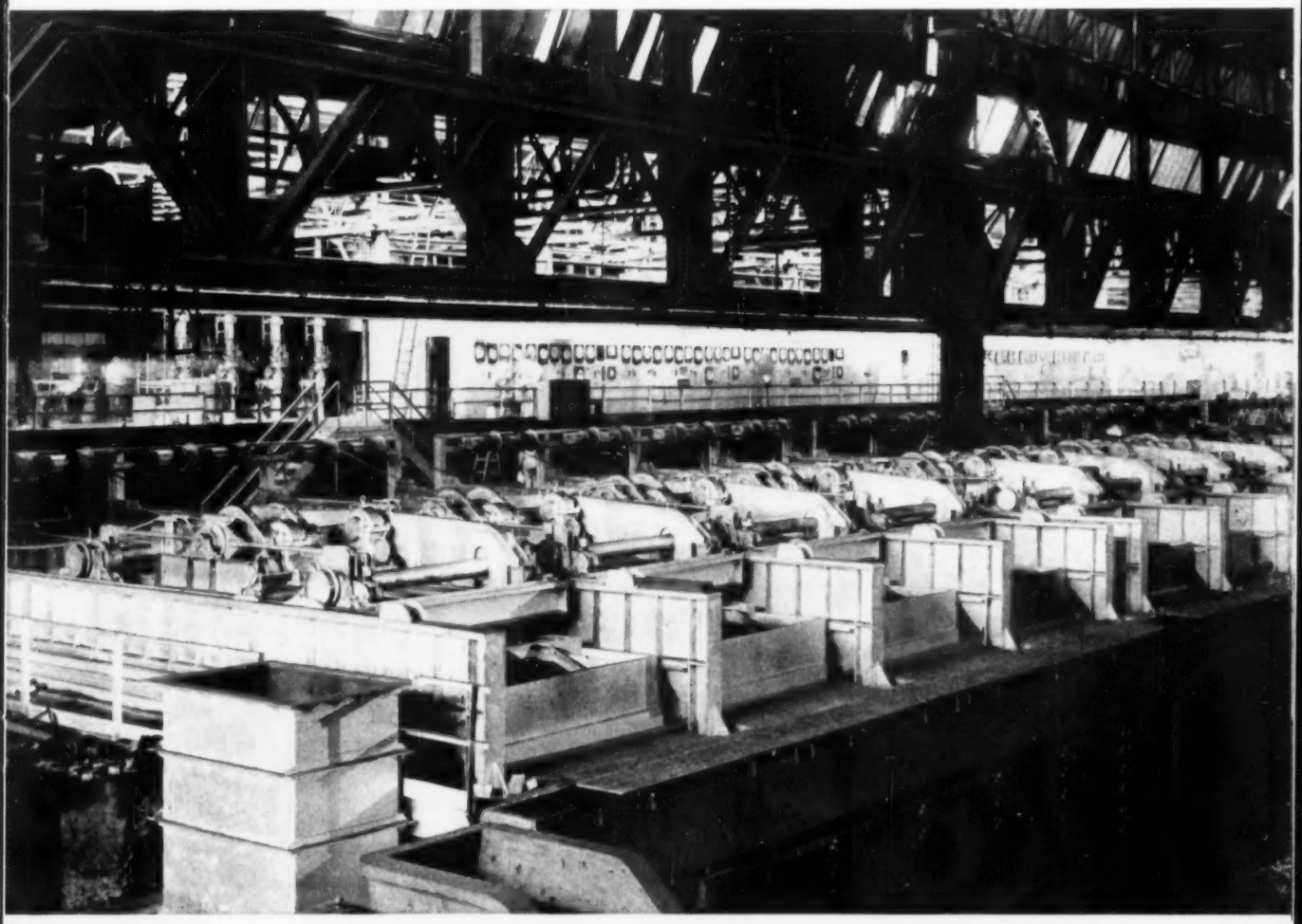
The pit nobody liked...

except our customers

This is of course our one-way fired soaking pit . . . fired from the top.

The location of the burner is only one of the features responsible for its enthusiastic acceptance. Most important however are the 30 years of experience and refinements which we have built into the pit since we first introduced it.

That is why, today, it is the pit everybody respects . . . especially our customers.



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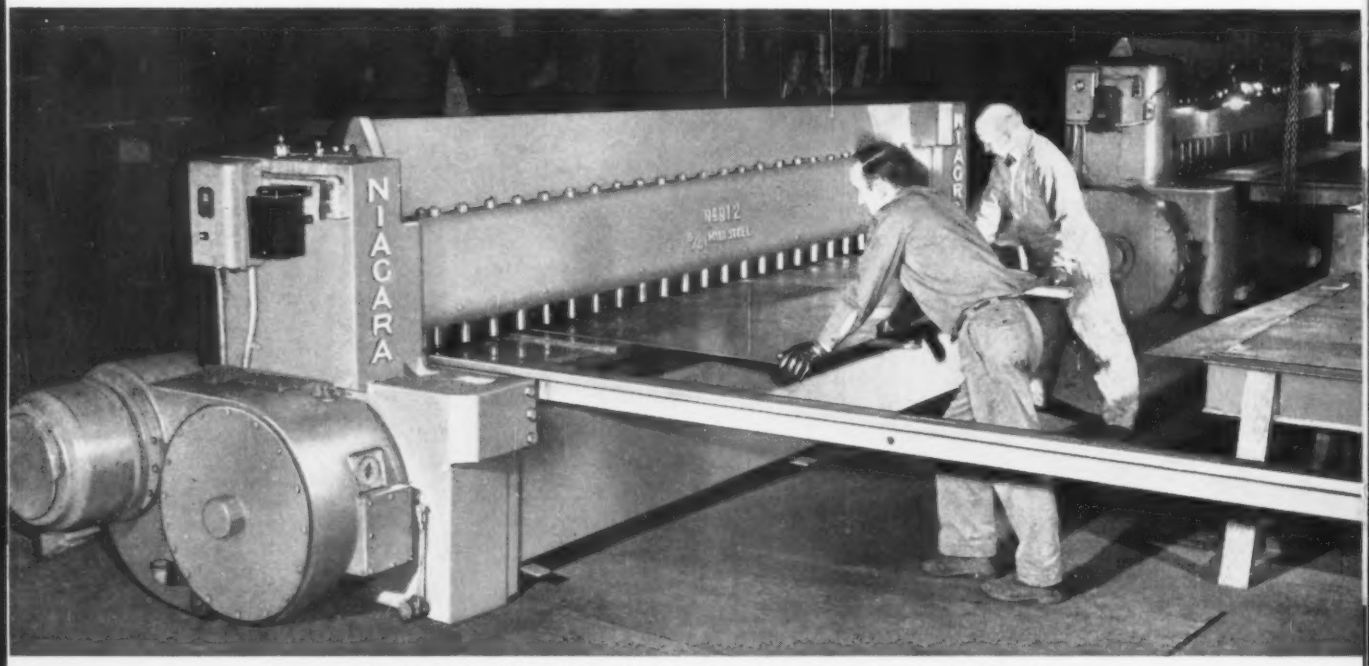
Surface®

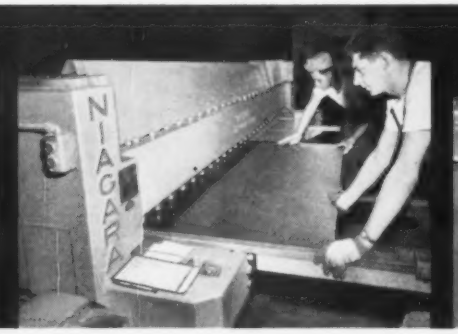
IN POWER SQUARING SHEARS . . .

Fruehauf picks Niagara for

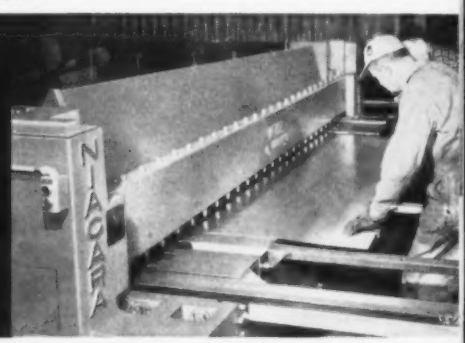


Niagara Model 912 shearing 18" x 30" transition plates from 10 gage hot-rolled steel for tank trailer frames.

Niagara Model 96 cutting forty 4" x 6" trailer gussets per minute from $\frac{3}{8}$" and $\frac{1}{2}$" bar stock.



Niagara Model 812 shearing 11 gage hot-rolled steel to 36" x 144" for trailer floor beams.



Niagara Model 812 at work shearing 24 gage stainless steel to 4' x 6'6" for van trailer door panels. Production: 2.7 pieces sheared all 4 sides per minute.

NIAGARA power squaring shears

America's most complete line of presses, press brakes, shears, other machines and tools for plate and sheet metal work.

"exceptional machine value"

World's largest trailer manufacturer spells out its reasons for using Niagara Underdrive Shears in producing a wide variety of parts from cold-rolled and hot-rolled steels, stainless and aluminum

As a metal fabricator, Fruehauf Trailer Company is well-qualified to speak. It not only manufactures every conceivable type of commercial trailer, but "builds more of them than any company in the world."

So, when it comes to power squaring shears, Fruehauf is particularly qualified to speak. Using several Niagara Models, it considers them an "exceptional machine value."

Enlarging on the point, Fruehauf engineers say, "Niagara Shears are capable of holding straight lines within thousandths of an inch . . . they keep their settings . . . trouble-free, they require a minimum of maintenance.

"They're well-balanced . . . can be moved about . . . require no special concrete base. We especially like their minimum height . . . can see over them. It's unlikely that an operator will step out from the shear in the path of a fork lift."

Like Fruehauf, progressive companies everywhere look to Niagara for exceptional machine value in a power squaring shear. Here are a few of the reasons:

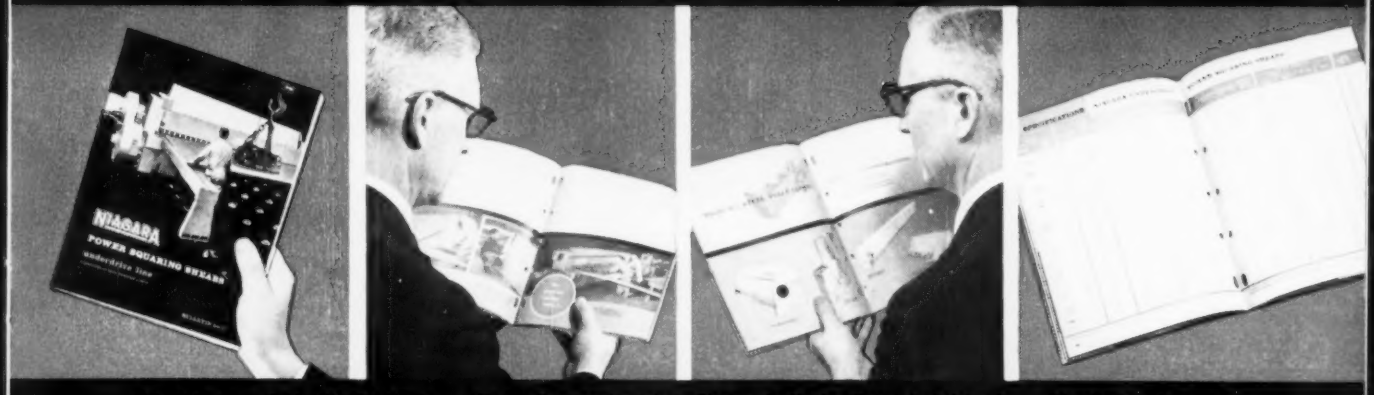
TAKE ACCURACY! Niagara's positive, power actuated, self-compensating holddown grips work securely. Fully closed box section construction of bed, crosshead, holddown and housings resists all stresses with minimum deflection.

TAKE SPEED! More working strokes per minute and instant engagement of Niagara's exclusive multi-point sleeve clutch assure more cuts per hour. Full visibility of the cutting line, ease of operation, quick setting gages and safety features boost hourly output.

TAKE MAINTENANCE! Niagara Shears are built to stand the gaff on the toughest jobs. Simplicity of design involving a minimum number of parts, and utmost accessibility cut out costly maintenance.

Any way you look at it, Niagara has the most to offer you in modern shear performance.

NIAGARA'S NEW, FACT-FILLED BULLETIN WILL GIVE YOU THE FULL STORY



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IA

A Boeing B-47 Stratojet medium bomber gets a take-off assist from 30 Phillips Petroleum Company M15 JATOs.

N-A-X HIGH-TENSILE is readily formed and welded. Here, before welding, a worker sizes the container's aft head, drawn by a 250-ton press. Bottom forging is locked in.

N-A-X HIGH-TENSILE STEEL FORMS AND WELDS READILY

Formability: Even at the higher strength levels (50% greater than mild carbon steel) this material can be cold formed and drawn into very difficult stampings and cold formed shapes.

Weldability: Its weldability by any process is excellent, maintaining toughness through a wide range of temperatures. Under-bead cracking tests are excellent. Using American Welding Society standard bead-weld testing, shows under-bead hardness rises only to 95 Rockwell from 80-85 Rockwell prior to welding.

Make *your* product better, too—
with this high-strength steel

How N-A-X® HIGH-TENSILE STEEL

supplied the money-saving answer to a critical take-off problem

JATO rockets boost heavily laden planes into the air faster, let them operate from shorter runways. A new JATO developed by Phillips Petroleum Company required a case that would endure a pressure of 1,000 pounds per square inch at the high blast temperatures. Yet it must be lightweight, easily fabricated, economical.

In 1954, 100 JATO cases of N-A-X HIGH-TENSILE steel were tested at Air Force Plant 66 near McGregor, Texas, where Phillips Petroleum is contractor-operator.

Result: The N-A-X HIGH-TENSILE case passed every test with flying colors. It *surpassed* the required standards for strength by as much as 20 percent.

The high-strength characteristics that make N-A-X HIGH-TENSILE a better steel for JATO fuel containers also make it better for many other types of pressure containers, where high strength and lighter weight are equally important. It is particularly suitable for Propane cylinders and pressure vessels for the chemical, automotive and oil industries, that must withstand severe interior pressures and handling abuses . . . and for such products as truck and trailer frames, wheels and bumpers, railroad and earth-moving equipment, shipping containers, pipe, and many others.

Other Important Advantages: N-A-X HIGH-TENSILE STEEL, compared with carbon steel, is 50% stronger • has high fatigue life with great toughness • is more stable against aging • is more resistant to atmospheric corrosion. It polishes to a high luster at minimum cost • has greater resistance to abrasion or wear • offers greater paint adhesion.

With N-A-X HIGH-TENSILE you can design longer life, strength with lightness, and economy into your products. Let us show you how.

COMPANION HIGH-STRENGTH STEEL IN THE N-A-X FAMILY

N-A-X FINEGRAIN. A low-alloy high-strength steel ideally suited for applications where the enhanced resistance to atmospheric corrosion of N-A-X HIGH-TENSILE is not required.

N-A-X HIGH-TENSILE STEEL

N-A-X Alloy Division
GREAT LAKES STEEL CORPORATION
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NATIONAL STEEL CORPORATION

N-A-X Alloy Div., Dept. A-1,
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☐ Please send me 8-page illustrated technical catalog on N-A-X HIGH-TENSILE Steel.

☐ Please have your representative contact me.

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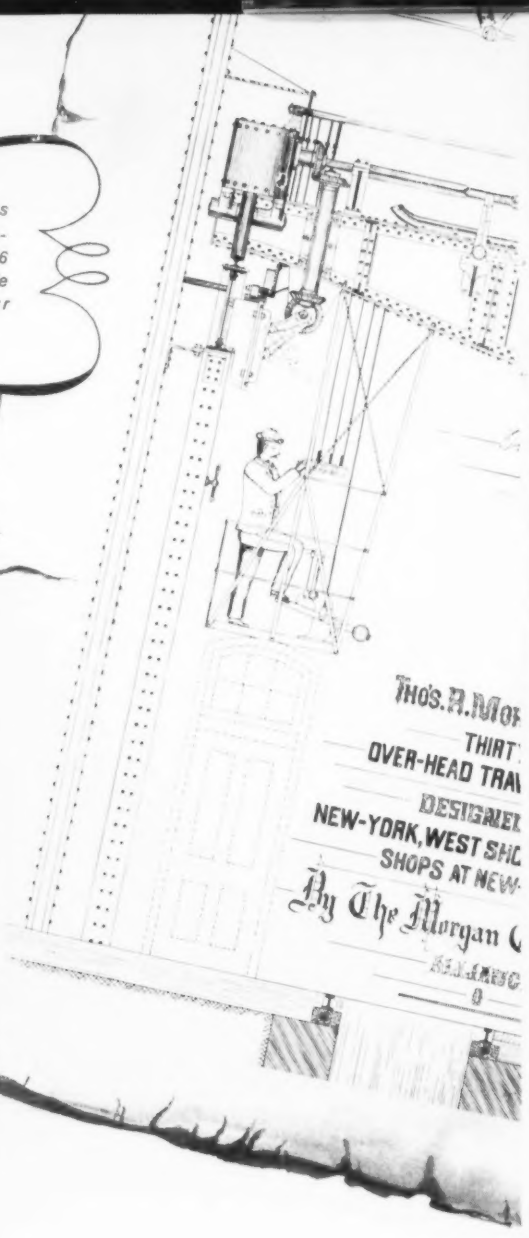
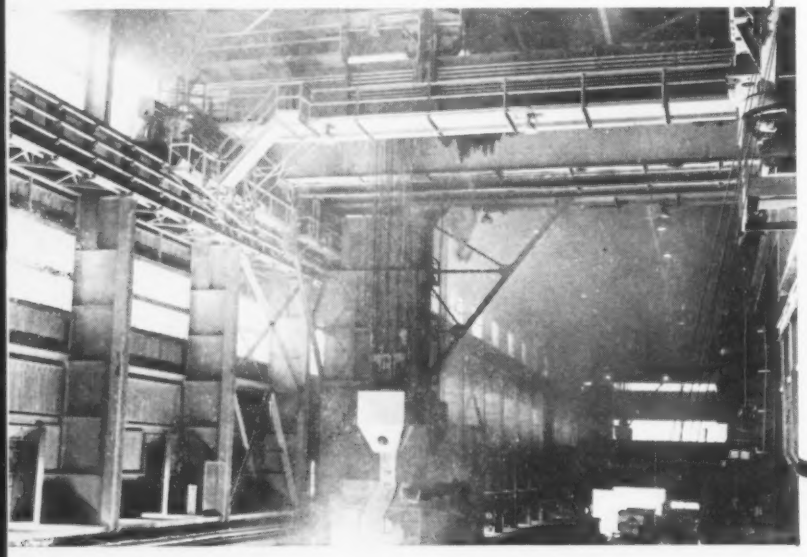
Since 1868, *the name MORGAN has stood for advanced design and trusted craftsmanship. A 14" x 20" reproduction of this 1886 patent drawing of a 35-ton crane is available for framing. Kindly send request on your company letterhead.*



CONTRAST *the controls of 68 years ago—pull ropes that engaged clutches on square shafts and a foot brake—with those of the modern Morgan crane. Today the operator rides in air-conditioned comfort. His controls automatically suit themselves to handling conditions, assuring maximum speed, safety and accuracy.*



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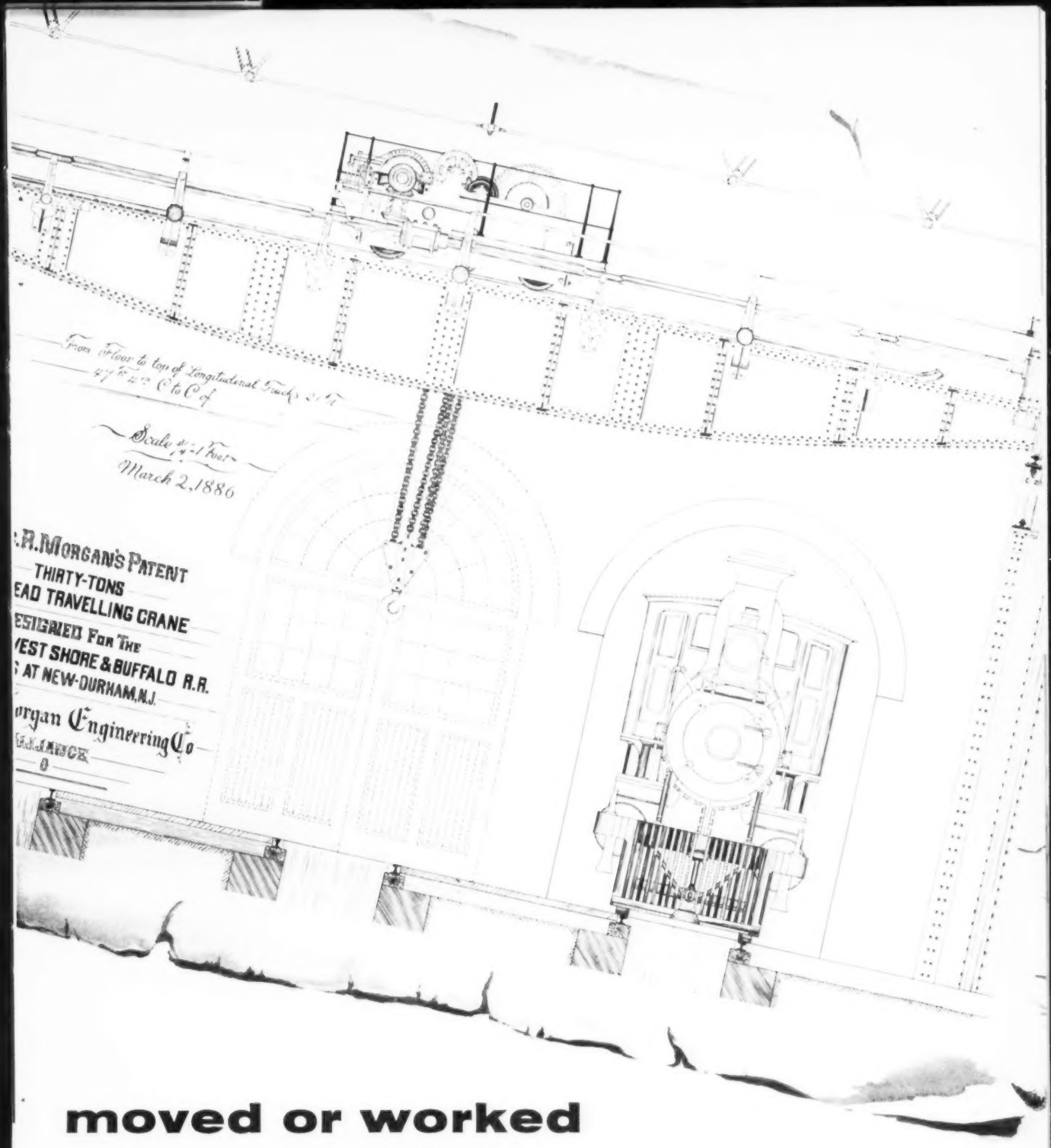
. . . wherever metal is made,

Speed production, cut costs, with Morgan Cranes and Mill Equipment

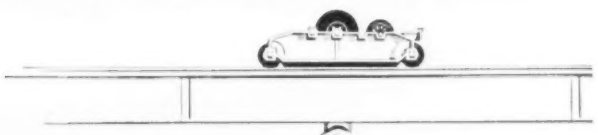
Advanced design and trusted craftsmanship are 89-year old Morgan traditions... important characteristics in the cranes, mills, chargers, and shears which must do the big, tough jobs in today's steel mills.

Since 1868, Morgan equipment has been used at the vital spots in maintaining continuous, lower cost production. Years of close contact with metal-producing problems and far-sighted research have resulted in a steady flow of mill equipment improvements . . . greater speeds and efficiency, greater capacities, lower operating and maintenance costs wherever you see the nameplate, "Morgan—Alliance, Ohio—U.S.A."

Let our representative show *you* how time counts in increasing production and profits . . . with Morgan equipment.



moved or worked



THE
MORGAN
ENGINEERING CO. *Alliance, Ohio*

Overhead electric traveling cranes, gantry cranes, open hearth special cranes, blooming mills, structural mills, shears, saws and auxiliary equipment.

Spring Maker Saves 75% of Storage Space with

COMPARISON PHOTOS show how 75% saving in floor space is achieved. At left is the Mather operation before Republic Bar Carriers. Materials were difficult to reach and handle. Inventory control expensive and difficult. Photo above shows neat rows of Republic Bar Carriers. The same amount of material is stacked in one-fourth the space. Length, width and height of carriers can be designed to meet your requirements for handling materials characterized by narrow dimensions.

REPUBLIC

REPUBLIC STEEL

World's Widest Range of Standard Steels

Republic Bar Carriers

GAINS AREA FOR PRODUCTION EQUIPMENT; IMPROVES INVENTORY CONTROL

When a manufacturer is able to reduce storage space requirements by 75%, there is sure to be an interesting story behind it. This one is still unfolding at the Toledo, Ohio, plant of Mather Spring Company, nationally known manufacturer of automotive springs and torsion bars.

Mather was faced with two major problems: (1) Lack of storage space for "in process" springs and materials; (2) Necessity for actually gaining floor space as production increases, to permit installation of new additional equipment.

Republic Materials Handling Engineers were contacted and in cooperation with Mather engineers made a thorough study of material flow, handling, and storage procedure. This study resulted in the design and fabrication by Republic's Pressed Steel Division of a modified version of the standard Republic P-135 Bar Carrier.

Equipped with tiering lugs and channel runners designed for four-way entry by fork-lift truck, the carriers are replacing a four-wheeled unit that Mather has been using. These older units cannot be tiered and consume valuable floor space. Frequent and expensive handling is required to reach desired material. Inventory control has been difficult.

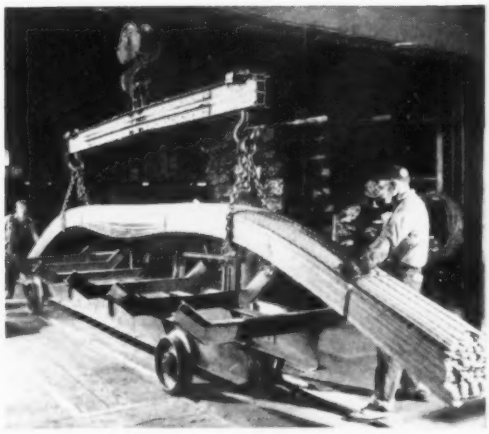
Installation of Republic Bar Carriers has resulted in a 75% saving in floor space, according to Mather engineers. The space gained will be used for installation of new production equipment. And with materials tiered in neat, orderly rows, Mather is able to maintain a close and accurate check on inventory.

Mather will also enjoy future savings, in reduced handling and maintenance costs. Corrugated-steel construction of the bar carriers provides strength, assures long service life at lowest per-year-cost.

Need more space in your operation? A standard unit from Republic's broad line of materials handling equipment may provide the answer. Or you may require the design of a completely new unit. Either way, our engineers will help you. Contact your Republic materials handling representative. Or send us the coupon. There's no obligation.

STEEL

and Steel Products



IMPROVE HANDLING of heavy and hard-to-manage materials with Republic Chain Slings. The basket-chain sling shown above is but one of many types available from Republic's Bolt and Chain Division. They are made to your requirements in alloy steel, high test steel or wrought iron. Fittings and accessories are given the same precision processing as the chain itself, assuring uniformity of the total assembly in strength and material. Because each type of sling has a specific use, we recommend talking over your requirements with a Republic chain engineer. Send coupon for more facts.

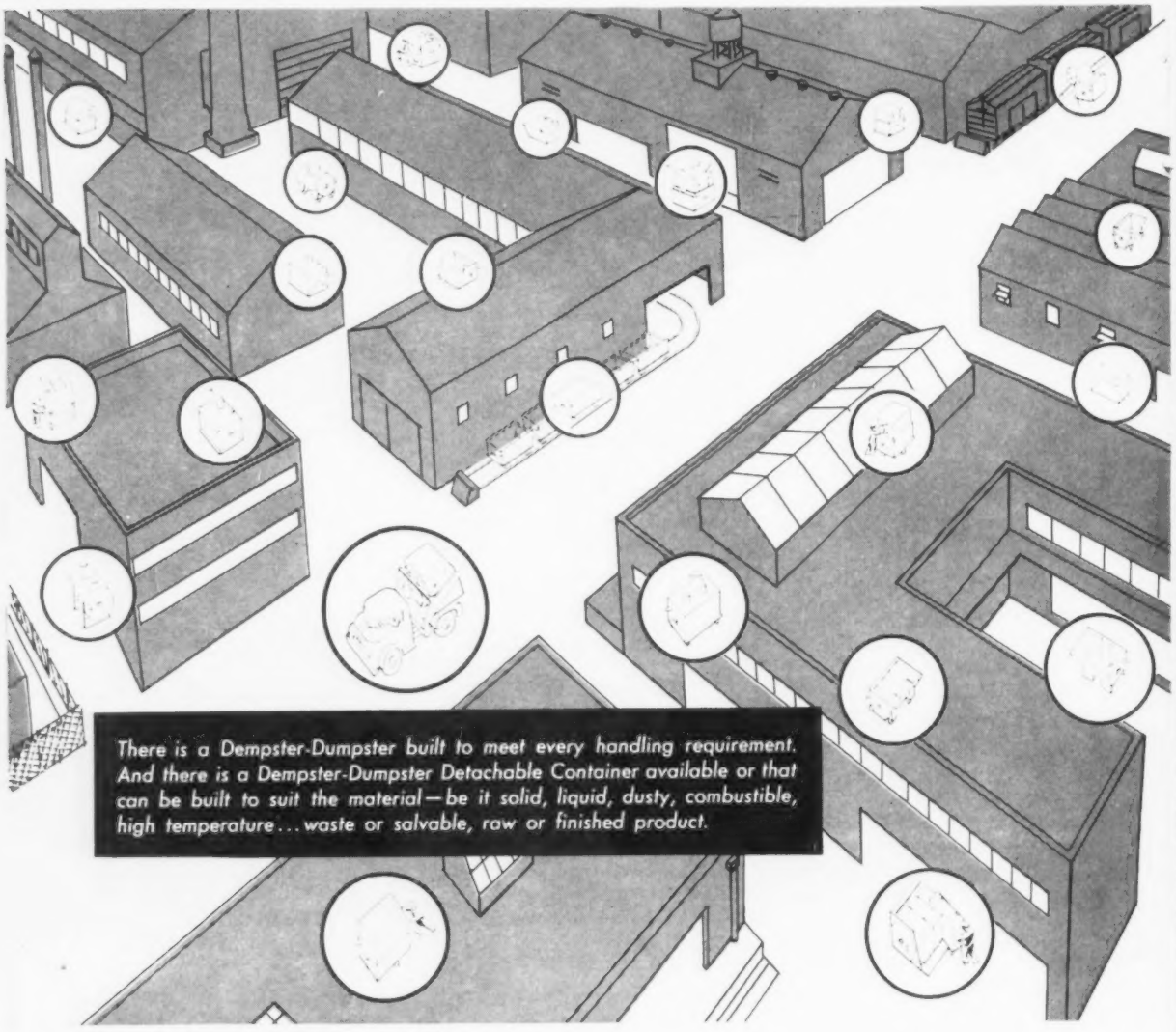
GAIN STRENGTH AND SPACE for storing of heavy dies, tools, parts, etc., with Republic Wedge-Lock Steel Shelving. It provides maximum loading in minimum floor space. Wedge-Lock Steel Shelving is specifically designed for high stacking of enormous weights. Joints get tighter and stronger as more weight is applied. Yet it is completely flexible to meet changing space requirements. Wedge-Lock Steel Shelving, a product of Republic's Berger Division, assembles quickly and easily. The coupon will bring you more facts.

REPUBLIC STEEL CORPORATION
Dept. C-3846
3104 East 45th Street
Cleveland 27, Ohio

☐ Send more information on Materials Handling Equipment.
☐ Have a Materials Handling Engineer call.
Send additional information on:
☐ Chain Slings ☐ Wedge-Lock Steel Shelving

Name_____ Title_____
Company_____
Address_____
City_____ Zone____ State_____

Who else wants to reduce materials

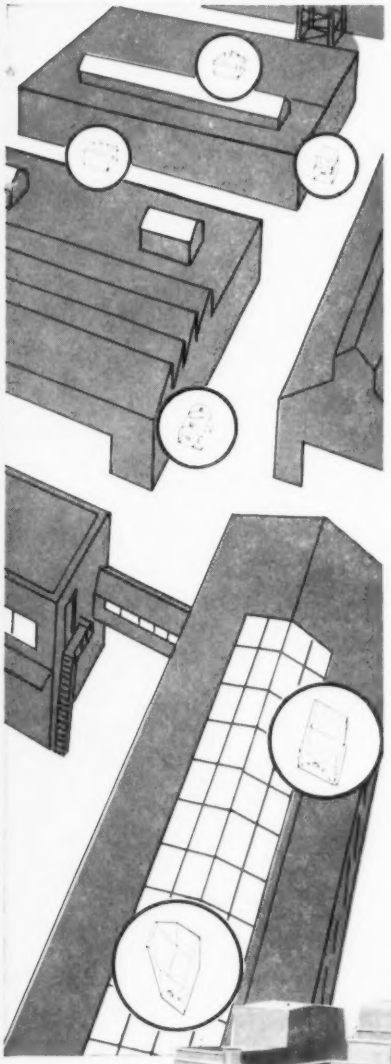


There is a Dempster-Dumpster built to meet every handling requirement. And there is a Dempster-Dumpster Detachable Container available or that can be built to suit the material—be it solid, liquid, dusty, combustible, high temperature... waste or salvable, raw or finished product.

With only one man, the driver, one Dempster - Dumpster serves scores of big detachable steel containers -- sizes 2 to 21 cu. yds... payloads up to 36,000 lbs!

SERVING COST-MINDED MANAGEMENT ALL OVER THE WORLD

handling cost 60% to 80% ? . . .



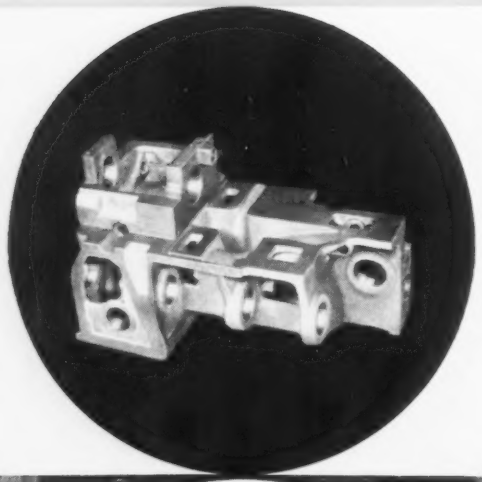
A FACT-FINDING SURVEY made by one of our engineers in cooperation with officials at one relatively small plant revealed labor cost of that firm's then-present-method was $6,552.00 annually. Labor cost would be $1,160.00 with the Dempster-Dumpster System — a saving of $5,392.00 annually (82 cents out of each $1.00). Investment in our equipment would amount to $10,000.00. In less than two years the equipment would pay for itself from its own savings produced for the user.

Results of a survey at a larger plant revealed annual labor cost amounted to $64,119.00, and would be $23,304.00 with the Dempster-Dumpster System — a saving of $40,815.00 (63 cents out of each $1.00). On an equipment investment of $40,968.00, the system would pay for itself in one year. In 5 years it would save this company over $200,000.00!

How much can this equipment save you? We recommend a fact-finding survey. No obligation, of course. It is the best way we have found to help you determine what can be expected of this system in your own particular operation. Or, perhaps you would prefer to first receive complete literature, free on request. May we hear from you? *Dempster Brothers, Inc.*

One Truck-Mounted
Dempster-Dumpster Handles Scores
of Containers . . . All Designs . . . All Sizes

DEMPSTER BROTHERS, 457 N. Knox, Knoxville 17, Tennessee



At Brown & Sharpe

Natcos Help From

At Brown & Sharpe, a 22-spindle Natco 3-way Machine handles finished drilling, boring and reaming on "00" screw machine beds

NATCO

Slash In-Process Time 16 Weeks to One Week

On Automatic Screw Machine Beds

Even on precise machine tool parts, traditionally handled on a "job-shop" basis, Brown & Sharpe gained great advantage by installing an automatic line. Prominent in the line are two Natcos, engineered and tooled to handle all drilling, boring and reaming on either the No. 00 or No. 2 automatic screw machine beds.

One Natco does all roughing—the second handles finishing. Total of 62 operations. Each Natco is tooled to process two parts at once—tooling is interchangeable to accommodate either sized bed.

Extreme machine tool accuracy must be maintained throughout. In one operation the Natco drills through five walls, holding centers parallel to the locating surface within .0015" for the full 42" distance. In another case, Natco engineering devised a tooling leaf that automatically drops through a core in the part, providing internal boring bar support.

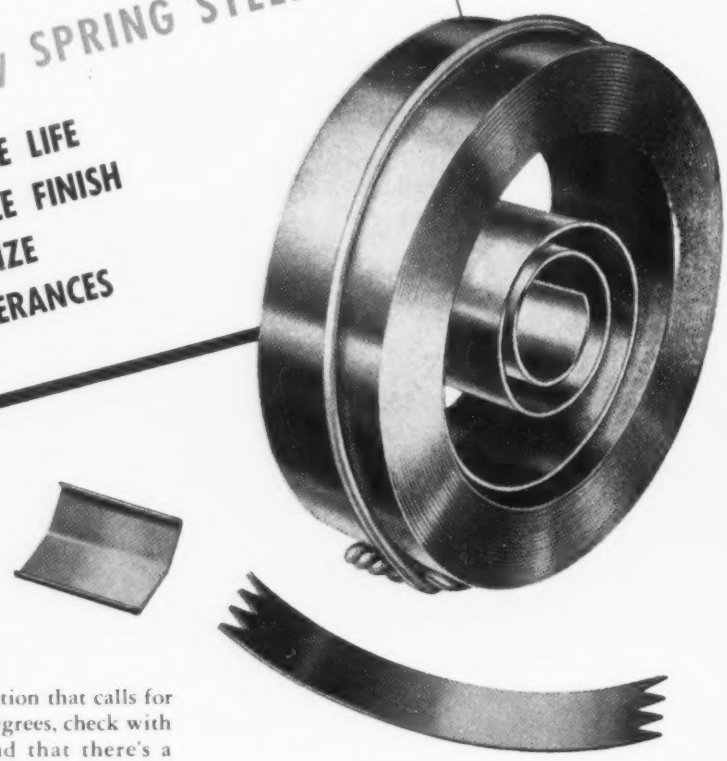
Natcos make sense even on "job-shop" jobs. Call in a Natco Field Engineer—he can quickly tell you whether a Natco can be a cost-saver on your next job.

National Automatic Tool Company, Inc.

Richmond, Indiana *Multi-spindle drilling, boring, and tapping machines. Special machines for automatic production. Call Natco Offices in Chicago, Detroit, New York, Buffalo, Boston, Philadelphia, Cleveland, Los Angeles; distributors in other cities.*

Check SANDVIK'S four point quality when you specify SPRING STEEL

- ✓ HIGH FATIGUE LIFE
- ✓ FINE SURFACE FINISH
- ✓ UNIFORM SIZE
- ✓ CLOSE TOLERANCES



When you have a spring steel application that calls for these properties in more-than-usual degrees, check with SANDVIK. You'll most likely find that there's a SANDVIK steel that will give you exactly the kind of spring performance that you want.

SANDVIK steels are made from the purest ore obtainable by carefully controlled processes. Charcoal of low phosphorous and sulphur content is used exclusively in the smelting. This inherent purity is the basic reason why SANDVIK steels have been meeting the high physical demands of a wide variety of special uses for over a quarter of a century.

You can get SANDVIK cold-rolled, high carbon or alloyed, spring steel

- annealed, unannealed or hardened and tempered
- with bright finish or blue or yellow polished
- with round edges or square edges
- in a wide range of thicknesses from .001" up.

Phone or write for further information and current stock lists. SS-22

SOME SANDVIK SPECIALTY STRIP STEELS

Band Saw Steels: Wood, Butcher and Metal · Clock and Watch Spring Steels Compressor Valve Steel · Conveyor Belting · Doctor Blade Steel · Feeler Gauge Steel · Knife Steels: Art, Surgical, Textile, etc. · Magnetic Sound Recording Tape Piston Ring Segment and Expander Steels Razor Blade Steel · Reed Steel · Shim Steel · Sinker Steel · Spring Steels · Textile Steels · Vibrator Reed Steel.

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230 North Michigan Ave., Chicago 1, Ill.—FRanklin 2-5638
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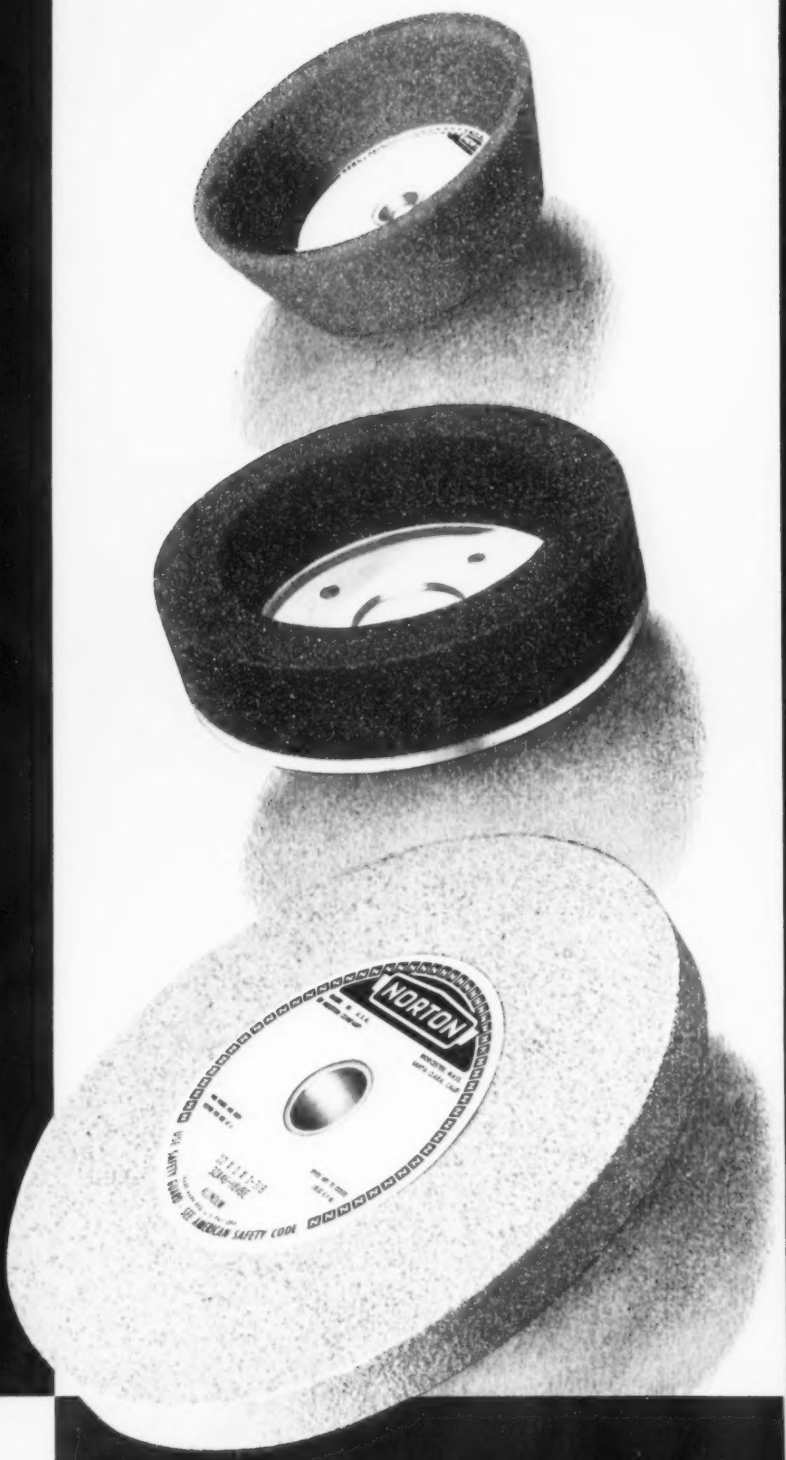

Number **1** in Supplying
the Abrasives You Need
for Your Work

Making better products...
to make your products better

NORTON

IS NUMBER 1

IN ABRASIVES

throughout the world!

In Product Variety
— a complete line of grinding wheels and abrasives to meet *all* your grinding and finishing requirements.

In Engineering Service
— skilled abrasive engineers the country over to help you solve your grinding and finishing problems.

In Customer Service
— distributor stocks in over 315 cities, large warehouse stocks in five cities, immense factory stocks — all backed by the production facilities of the world's largest grinding wheel plant.

In Abrasive Research
— over 180 scientists and technicians in specialized laboratories using the very latest scientific apparatus developing new and improved abrasives and bonds to cut your grinding costs.

NORTON COMPANY • WORCESTER, MASS.

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*Warehouse Facilities and Stocks at this location

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BEHR-MANNING CO., Troy, N.Y. is a division of Norton Company

5 57

University of Michigan's Switching Station
Uses Youngstown "Buckeye" Conduit
to Protect Electrical Wiring Systems . . Permanently

University of Michigan's new, up-to-the-minute, West Hospital Switching Station has positive, permanent electrical system protection—thanks to Youngstown's Full Weight Rigid Steel "Buckeye" Conduit. Damaging elements such as water, moisture, vapor, dust and dirt will never cause electrical faliure—because "Buckeye" will be on the job around-the-clock for the life of the building.

Electrical systems that fail to function properly are definitely a bad investment—from any standpoint. So to make sure your installations are safe and efficient, always specify Youngstown "Buckeye" Conduit—as so many of our leading owners, architects and contractors have done for years.

Satisfied "Buckeye" users across-the-country report to us, "It's easier to thread and bend—easier to fish wires through—and best of all, we get longer service life because it's so thoroughly corrosion-resistant."

Leading distributors in all industrial and electrical markets are ready to serve you quickly and efficiently from their ample stocks. They're as near as your phone—why not call today?

THE YOUNGSTOWN SHEET AND TUBE COMPANY

Manufacturers of Carbon, Alloy and Yoloy Steel

General Offices - Youngstown 1, Ohio

District Sales Offices in Principal Cities

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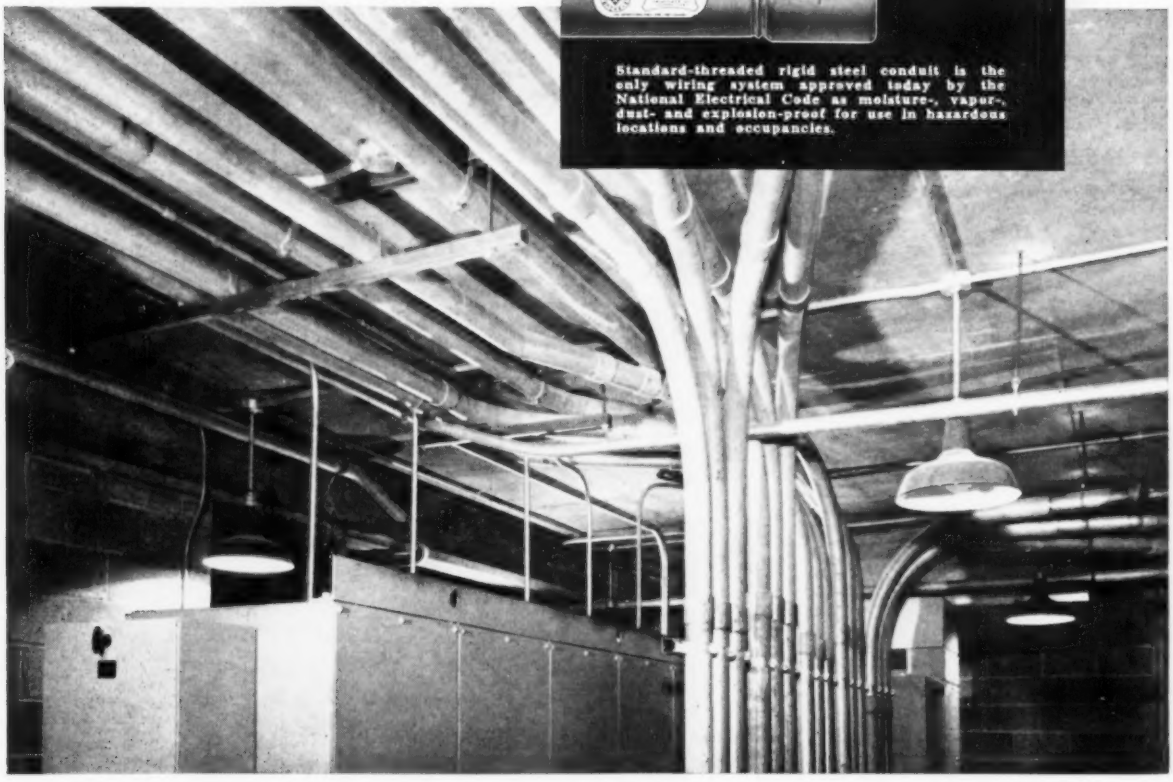
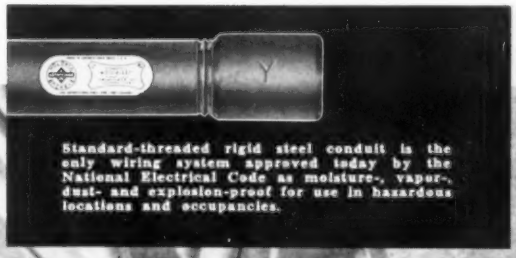
Engineers: Cummins & Barnard, Inc., Ann Arbor, Michigan
Electrical Contractor: Electric Service Co., Ann Arbor, Michigan





Standard-threaded rigid steel conduit is the only wiring system approved today by the National Electrical Code as moisture-, vapor-, dust- and explosion-proof for use in hazardous locations and occupancies.

Why designers specify FLEXLOC self-locking nuts

Where products must be tough . . . must stand up under vibration, shock and abuse . . . designers specify rugged, reliable, precision-built FLEXLOC self-locking nuts as fasteners.

HERE'S WHY:

FLEXLOC locknuts are strong: tensile strengths far exceed accepted standards. They are uniform: carefully manufactured to assure accurate, lasting spring tension in the flexible locking collars. And they are reusable: rough screw threads, repeated removal and replacement, frequent adjustments will not affect their locking life.

Standard FLEXLOC self-locking locknuts are available in a wide range of standard sizes and materials, to meet the most critical locknut requirements. Your authorized industrial distributor stocks them. Write us for complete catalog and technical data. Flexloc Locknut Division, STANDARD PRESSED STEEL CO., Jenkintown 17, Pa.

STANDARD PRESSED STEEL CO.

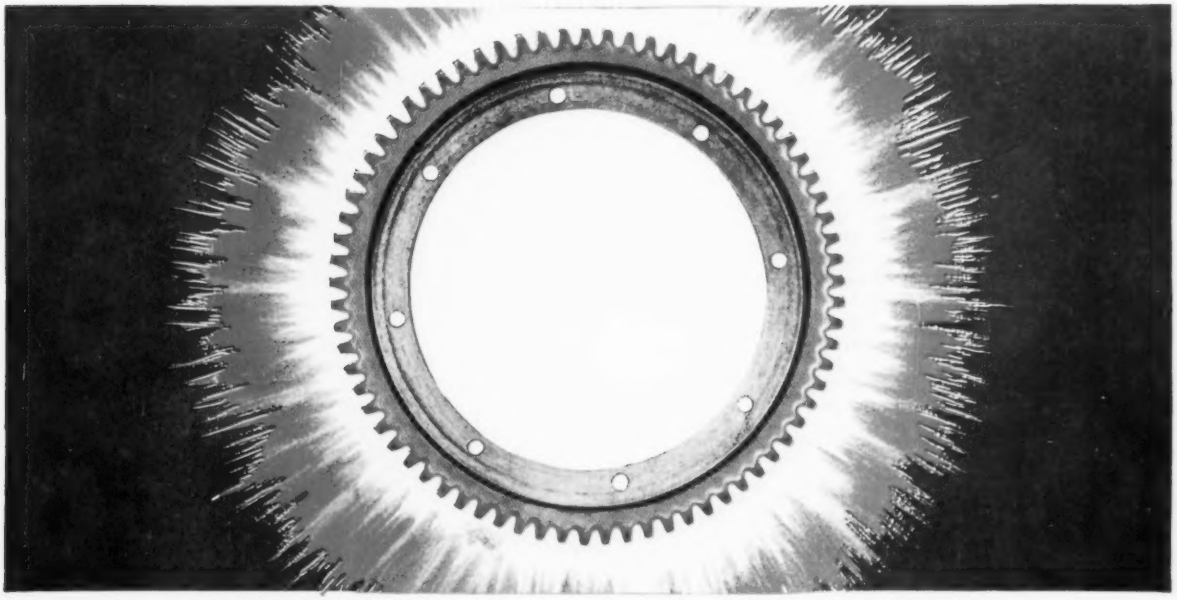
FLEXLOC® LOCKNUT DIVISION

SPS

JENKINTOWN PENNSYLVANIA

Saves $82,507 Per Year

with TOCCO Induction Hardening*



Gears, shafts, pins, wheels, tubes and bars—almost any size or shape of part—or any metal, too—is adaptable to TOCCO hardening, brazing, annealing or heating for forging.

Production Up—Engineers at the Milwaukee Works of International Harvester Company have adopted TOCCO for hardening final drive gears for famous International Harvester farm tractors. TOCCO increases production on the gear shown here from 14 to 35 per hour, 250% faster than conventional heating method, reduces job from a 3 shift to 2 shift operation, even with increased production schedule. Heating time is 35 seconds; oil quench, 60 seconds.

Costs Down—TOCCO cuts cost—saves $82,507 per year on application shown above. TOCCO makes possible use of C-1050 A.R.R. steel instead of expensive A-8645-H alloy steel previously required. TOCCO also eliminates shot-blast, formerly needed to remove scale, and extra machining operations that used to be necessary to compensate for distortion.

Gear shown is 18½" O.D., width of face is 2", weight 34 pounds, 73 teeth. Hardness obtained is 55-66 R.C., using 140 K.W. of 10,000 cycle power.

Our Engineers can probably find applications in your plant where TOCCO can increase output and reduce unit costs.

THE OHIO CRANKSHAFT COMPANY

Mail Coupon Today — NEW FREE Bulletin

The Ohio Crankshaft Co. • Dept. A-5, Cleveland 5, Ohio

Please send copy of "Typical Results of TOCCO Induction Hardening and Heat Treating".

Name_____

Position_____

Company_____

Address_____

City_____ Zone____ State_____

Simplicity Model S-200 Asphalt Plant recently delivered to Ben M. Hogan & Company, Little Rock, Ark. This is Hogan's fourth Simplicity Plant, and is producing well over 100 tons of asphalt mix per hour.

"4 times around the world—that's how far we estimate a Standard Steel ring will travel as an integral part of a Simplicity Asphalt Plant"

"In 40 years of service we estimate that a bull gear and tire on the rotating dryer drum of a Simplicity Asphalt Plant travels at least 100,000 miles to make four million tons of asphalt without defecting. These and other components of our asphalt plants are forged by Standard Steel Works.

"But we are not only justly proud of the durability of our products, thanks in part to Standard, but also of the service we render our many customers—both in terms of delivery and of maintenance. And that's where Standard Steel Works is of greatest value to us. A special delivery arrangement with Standard Steel Works, plus their personalized service, helps us maintain superior service to our customers."

Frankly, we feel we deserve this fine compliment from Mr. Whitfield. We know how important it is for *our* customers to keep *their* customers satisfied. That's why we take a special interest in their needs and keep letting our men in the shop know the importance of the role they play in helping our customers maintain a favorable competitive position.

Why not invite us to discuss your casting, forging and weldless ring needs with you. It won't cost you anything, and we can probably show you ways in which our service can save you money. Write Dept. I-E.

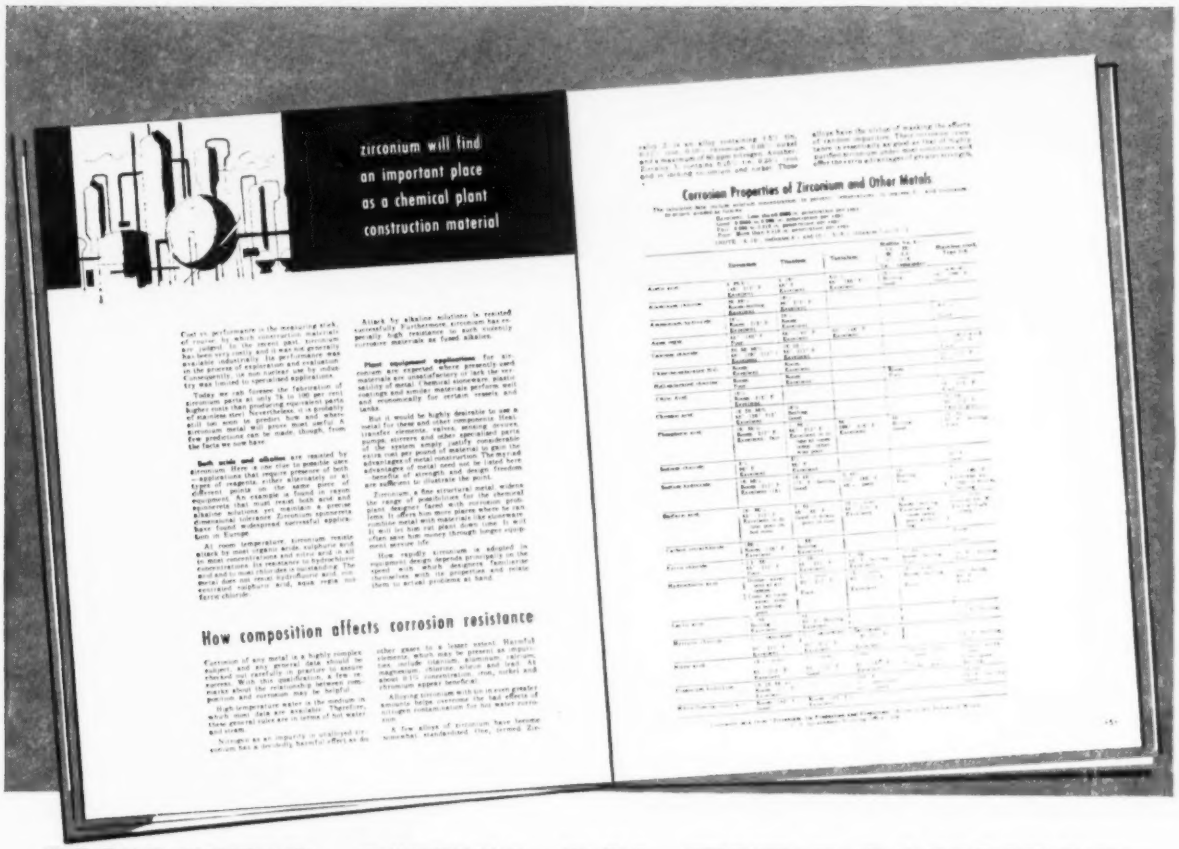
"About five years ago we furnished a replacement 8 ft. x 15 ft. dryer drum to a customer whose dryer had been in service on a Simplicity Asphalt Plant for 25 years. The steel tires and bull gear of the old dryer showed no signs of wear and were used in the new drum. Those rings were supplied to us by Standard Steel Works. That's why we know the quality of Standard's rings is as good as the service they render us," *says Harlan Whitfield, of The Simplicity System Company, Chattanooga, Tenn.*

Standard Steel Works Division

BALDWIN · LIMA · HAMILTON

BURNHAM, PENNSYLVANIA

Rings • Shafts • Car wheels • Gear blanks • Flanges • Special shapes


zirconium will find
an important place
as a chemical plant
construction material
How composition affects corrosion resistance
Corrosion Properties of Zirconium and Other Metals

WHAT'S NEW ON ZIRCONIUM?

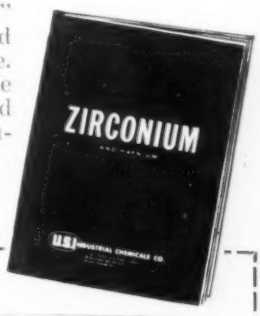
This U.S.I. booklet gives you information you can use . . . Send for a copy!

Today, with zirconium production trending sharply upward, and price downward, interest in this new and unique metal is growing rapidly.

To answer your questions about zirconium and its relative, hafnium, U.S.I. has prepared an informative new booklet — "ZIRCONIUM and HAFNIUM." The booklet gives the important facts on these newly available metals . . . lists important mechanical and physical properties of both . . . describes briefly the new semi-continuous sodium reduction process for production of zirconium and hafnium.

You'll find the outstanding corrosion properties of zirconium compared with other important metals... phase diagrams of twenty binary alloy systems . . . descriptions of several fabrication techniques.

You're sure to find "ZIRCONIUM and HAFNIUM" valuable in discussions and as a preliminary reference. For your copy, forward the coupon today . . . or just send your name on your company's letterhead.



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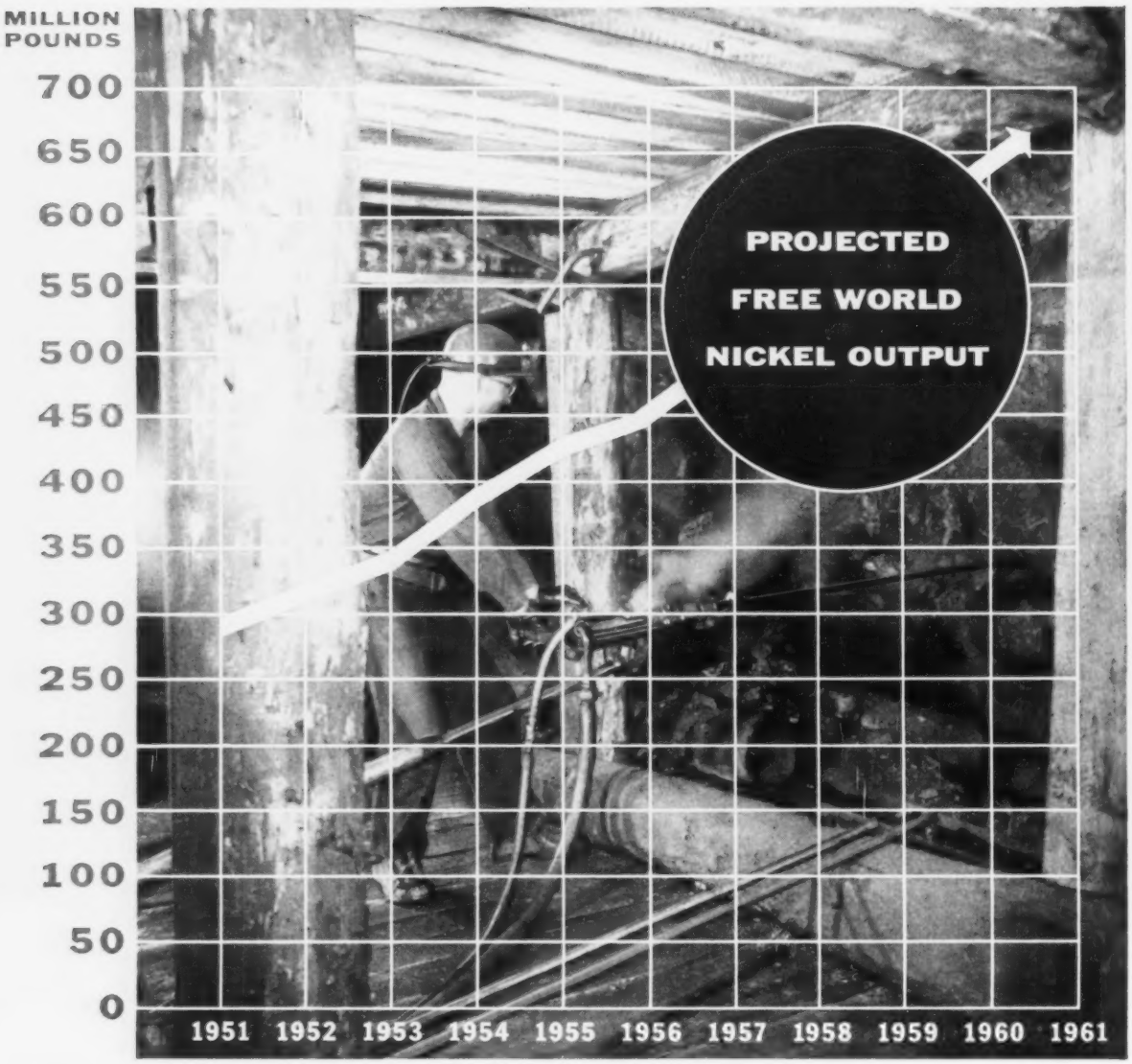
Please send me a copy of "ZIRCONIUM and HAFNIUM"

Name
Title
Company
Street
City Zone State



Another 50% advance in nickel industry's production capacity

Paced by Inco-Canada's new developments in Manitoba, producers put 1961 Free World nickel output at 650-675 million pounds a year—up 130% over 1951

In 1951, the nickel industry of the *Free World* produced about 290 million pounds of nickel.

Last year, the over-all output of the industry set a new record high of 450 million pounds.

This was an expansion of more than 50% in five years: a substantial production boost that indeed benefited industry, but only after vital defense and government stockpile needs were given preference.

New Inco-Canada developments help set new goals

Right now Inco-Canada, with years of exploration behind the project, is pushing construction at its new Manitoba mines: developing in the far North a new, big-tonnage nickel-producing area.

In Ontario, at the same time, Inco-Canada is continuing to expand its Sudbury capacity.

In 1961, this should lift Inco-Canada's nickel output to 385 million pounds a year. A hundred million more than in 1956!

With the steadily increasing capacity of all *Free World* producers, in the next four years nickel production should be lifted to the all-time high of 650-675 million pounds a year.

With 1961 capacity anticipated at more than twice what it was in 1951—and with continuing exploration—nickel users are assured of more nickel in their future.

The International Nickel Company, Inc., New York 5, N.Y.

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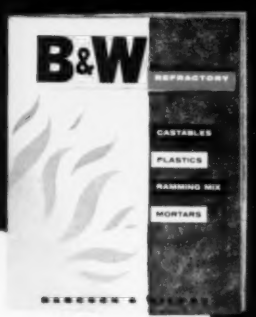
INCO **International Nickel**

The International Nickel Company, Inc., is the U. S. affiliate of The International Nickel Company of Canada, Limited (Inco-Canada)—producer of Inco Nickel, Copper, Cobalt, Iron Ore, Tellurium, Selenium and Platinum, Palladium and Other Precious Metals

What are your refractory castable problems ?

- High Temperatures?
- Abrasion and Erosion?
- Slag Attack?
- Overhead Applications?
- Insulating Properties Required?

B&W makes a wide range of specialized refractory castables. Whatever your problem, you will find helpful data in B&W Bulletin R-35. Send for your copy today.



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B&W REFRACTORIES PRODUCTS: B&W Allmul Firebrick • B&W 80 Firebrick • B&W Junior Firebrick • B&W Insulating Firebrick • B&W Refractory Castables, Plastics and Mortars • B&W Silicon Carbide

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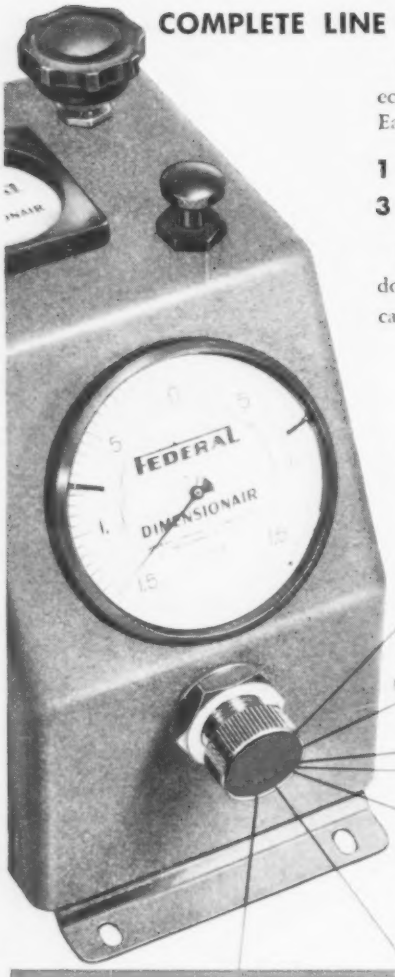
WORKS: AUGUSTA, GA.

GET MORE OUT OF AIR GAGING WITH THE DIMENSIONAIR

COMPLETE LINE OF ATTACHMENTS FOR EVERY MEASURING NEED



It's so easy to greatly increase the scope of Dimensionair usefulness — and do it economically by using any of the "already designed and built" Attachments. Each of these Attachments answers three basic requirements.

1 Easily attached. **2** Wide range of adjustment.

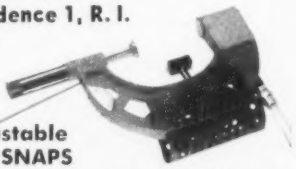
3 Performance in keeping with quality of the Dimensionair

Let us show you how these Attachments will give you more for your air gaging dollar. Write for Catalog 56D or ask our nearest representative to discuss applications in terms of your own needs.

FEDERAL PRODUCTS CORPORATION
7135 Eddy Street • Providence 1, R. I.

AIRPROBE

Small and easily attached to many types of stock model gages. The ideal Attachment where mechanical contact is desired. Its long range per magnification and availability in .003, .006, .015, and .030 ranges adapt it for practically any type of air gaging, thereby bringing the benefits of air gaging to more unusual types of measurement.



Adjustable AIR SNAPS

Made in five sizes, 0" to 6", each having a wide range of adjustment. Anvils, precision lapped, remain flat and parallel throughout entire range of adjustment. Does not disturb the regular Dimensionair calibration: (.003" range at 2500:1 magnification.) Self-zeroing so that only a single master is required.

Adjustable AIR BORE GAGES

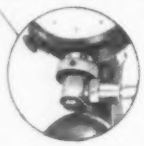
Only four gages cover all measurements from ½" to 8". Concentricity of centralizing contacts with the measuring contacts is so precise gage can be set with gage blocks or micrometer. Centralization remains accurate even though gage is cocked laterally, and is maintained throughout the capacity of the gage.

AIR RINGS

Regularly furnished with two or three jets. Can also be furnished with one, four, or six jets. Jets are larger and recessed farther below surface than in competitive makes. This helps eliminate clogging and reduces wear. Inside diameters from .250" up to and including 3.010". Smaller and larger sizes on application.

AIR PLUGS

Furnished in various types . . . Through Hole, Counterbore, and Blind . . . and having one, two, three, four, or six jets as required. Available from .125" diameter, up. Smaller sizes available. The jet faces are set lower in plug and provide greater protection against damage: air jets are larger and less easily clogged. Available from stock in many sizes.



ARNOLDAIR

Links the Federal Dimensionair to your Arnold Grinding Gage to provide closer operator control than is possible using a Dial Indicator alone. The Arnoldair response smooths out surface irregularities, allowing the operator to consistently grind pieces within .0001" of nominal. Easily attached to any Arnold Gage. Catalog 55A.

SPECIAL ATTACHMENTS AND FIXTURES

When the nature of the work or other conditions necessitate Special Attachments, Federal Engineers with their specialized gaging experience can provide the right design. Whether it's a specially designed Attachment or a modification of a regular design you can be sure it will be the best gaging Attachment for your work.

Ask **FEDERAL** *First*

FOR RECOMMENDATIONS IN MODERN GAGES . . .

Dial Indicating, Air, Electric, or Electronic — for Inspecting, Measuring, Sorting, or Automation Gaging

...lets one man handle work you'd pay a crew to do!

By putting new efficiency, safety and positive control into the hands of Towmotor lift truck operators you enable them to do a *bigger day's work, easier.* You let each one handle jobs you'd normally hire a *gang* to do.

Through modern Towmotor mass-handling each operator has the power to improve your profit picture, because the new Towmotor fork lift trucks multiply their productivity. Look over the new features that operators like best about our latest models—such as:

- New planned-comfort design
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- Double action hydraulic tilt
- Newly-improved power steering
- "3-second access" to engine
- Famed 12" reach for all controls

Before you decide on your next fork lift truck, we urge you to get all the facts on the newly-designed Towmotor units. Write to Towmotor Corporation, Cleveland 10, Ohio today and ask for our new illustrated lift truck booklet—No. SP-23.

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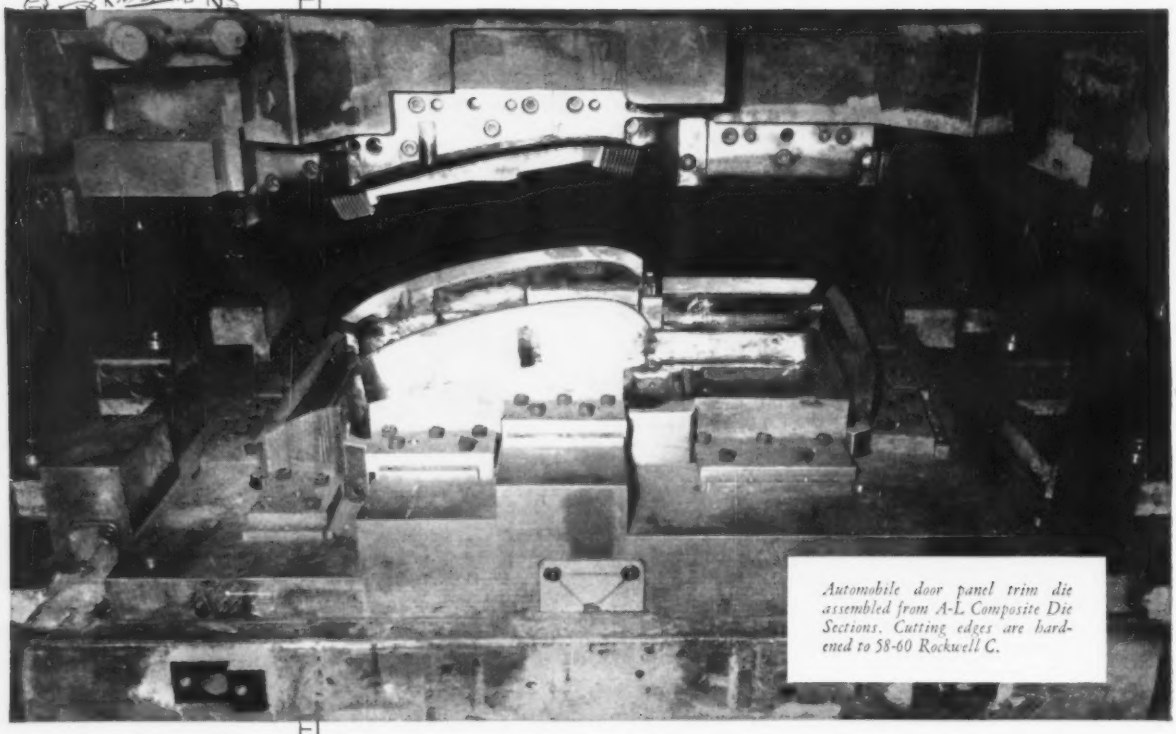
Gerlinger Carrier Company, Dallas, Oregon, is a subsidiary of Towmotor Corporation

Why pay the price for CUSTOM-MADE DIES...

when you can easily assemble the shapes you need

from A-L COMPOSITE DIE SECTIONS



Automobile door panel trim die assembled from A-L Composite Die Sections. Cutting edges are hardened to 58-60 Rockwell C.

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"FORGING AND CASTING PRODUCTS"

Contains the latest information on FCC Air Hardening, Oil Hardening and other Cast-To-Shape Tool Steel Specialties that can save you time and money . . . also Composite Die Sections and Smooth Hammered Forgings in a wide range of tool and stainless steels. *Don't wait—get your copy NOW.*

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Dies can be assembled from A-L Composite Die Sections to blank, trim, bead or do any job requiring the cutting of sheet metal to regular or irregular shapes. Thousands of die shapes are possible from combinations of the thirty-five standard sections carried in stock. Thus, you save the time and trouble of machining custom-made sections from solid stock and minimize the waste of valuable tool steel.

These standard sections . . . made in a variety of water hardening tool steel grades . . . are electrically butt welded by a special process to non-hardenable mild steel bases. Because the base always remains soft, screw and dowel holes are easily drilled after the tool steel edges have been machined and heat treated.

Ask your Allegheny Ludlum representative about this money-saving method of die making . . . or write *Allegheny Ludlum Steel Corporation, Forging and Casting Division, Wanda and Jarvis Aves., Detroit 20, Mich.*

For complete MODERN Tooling, call

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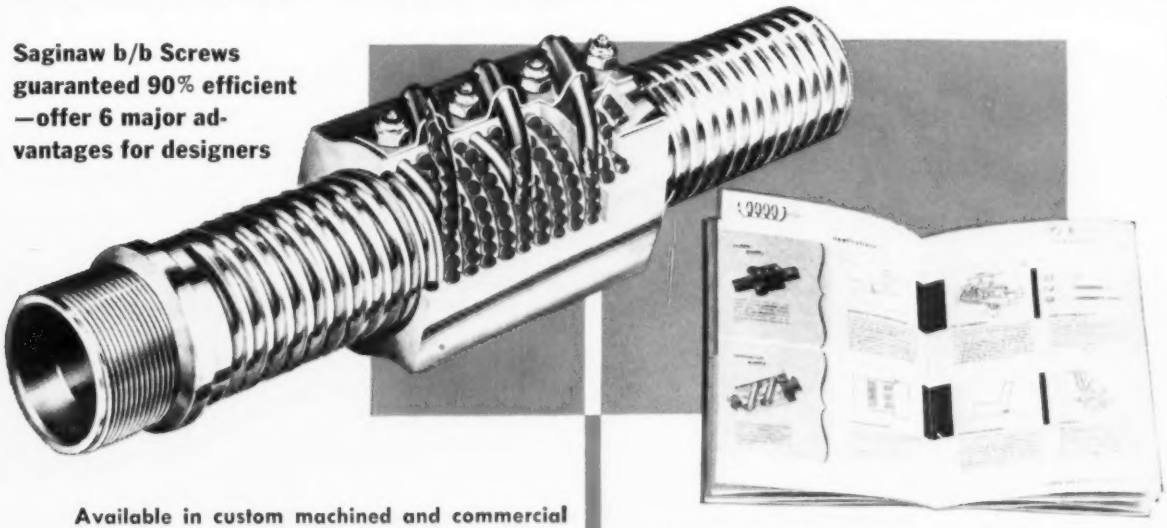
AL® FINE TOOL STEELS SINCE 1854

WSW 6079

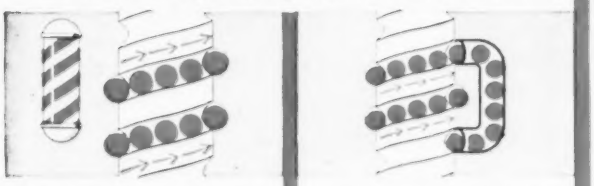
ACTUATION PROBLEM too tough for ordinary devices?

SAGINAW CAN HELP YOU SOLVE IT!

Saginaw b/b Screws guaranteed 90% efficient —offer 6 major advantages for designers



Available in custom machined and commercial rolled thread types—have been built from 1½ inches to 39½ feet long—⅜ to 10 inches diameter.



Nut *glides* on steel balls. Like stripes on a barber pole, the balls travel toward end of nut through spiral "tunnel" formed by concave threads in both screw and mating nut.

At end of trip, one or more tubular guides lead balls diagonally back across outside of nut to starting point, forming closed circuit through which balls recirculate.

1 VITAL POWER SAVINGS. With guaranteed efficiency of 90%, Saginaw b/b Screws are up to 5 times as efficient as Acme screws, require only ⅓ as much torque. This permits much smaller motors with far less drain on the electrical system. Circuitry is greatly simplified.

2 SPACE/WEIGHT REDUCTION. Saginaw b/b Screws permit use of smaller motors and gear boxes; eliminate pumps, accumulators and piping required by hydraulics. In addition, Saginaw b/b Screws themselves are smaller and lighter. Units have been engineered from 1½ in. to 39½ ft. in length.

3 PRECISE POSITIONING. Machine-ground Saginaw b/b Screws offer a great advantage over hydraulics or pneumatics because a component can be positioned at a predetermined point with precision. Tolerances on position are held within .0006 in./ft. of travel.

4 TEMPERATURE TOLERANCE. Normal operating range is from −75° to +275° F., but assemblies have been designed in selected materials which function efficiently as high as +900° F. These units are practical where hydraulic fluids have lost efficiency or reached their flash point.

5 LUBRICATION LATITUDE. Even if lubrication fails or cannot originally be provided because of extreme temperatures or other problems, Saginaw b/b Screws will still operate with remarkable efficiency. Saginaw units have been designed, built and qualified for operation without any lubrication.

6 FAIL-SAFE PERFORMANCE. Far less vulnerable than hydraulics. In addition, Saginaw offers three significant advantages over other makes: (1) Gothic arch grooves eliminate dirt sensitivity, increase ball life; (2) yoke deflectors and (3) multiple circuits provide added assurance against operating failure.

Saginaw ball bearing Screws and Splines

SAGINAW STEERING GEAR DIVISION OF GENERAL MOTORS

WORLD'S LARGEST PRODUCER OF BALL BEARING SCREWS AND SPLINES

YOUR FREE COPY OF THIS NEW b/b SCREW AND SPLINE "PROBLEM SOLVER" SHOWS HOW

36 pages crammed with time-, work-, and money-saving facts: Principles • Types • Basic Operations • Coupling Methods • Efficiency • Advantages • Selection Factors • Design Data • Sample Problems

SAGINAW b/b SPLINE

● Averages 40 times lower coefficient of friction than ordinary sliding splines!

Utilizing the same basic *gliding ball* principle, Saginaw has developed the *Saginaw b/b Spline* which radically increases the efficiency of transmitting or restraining high torque loads.

It can be fitted with integral gears, clutch dogs, bearing and sprocket seats, etc. Units have been built from 3 inches to 10 feet long—⅜ to 6 inches in diameter.

SEND TODAY FOR THIS FREE 1957 ENGINEERING DATA BOOK . . .

or see our section in Sweet's Product Design File

Saginaw Steering Gear Division
General Motors Corporation
b/b Screw and Spline Operation
Dept. 7X, Saginaw, Michigan

Please send new engineering data book on Saginaw b/b Screws and Splines to:

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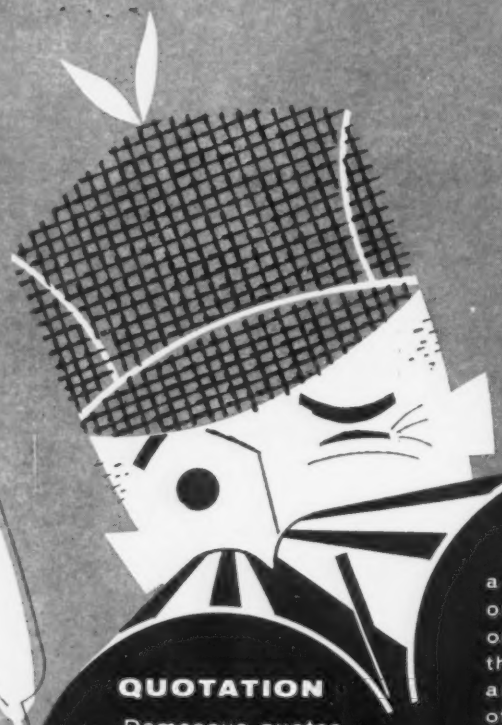
FOR STAINLESS STEEL TUBING AND PIPE



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On popular sizes and grades your order is filled from our stocks. Delivery, therefore, is prompt and dependable . . . often your shipment leaves our dock the same day the order is received.

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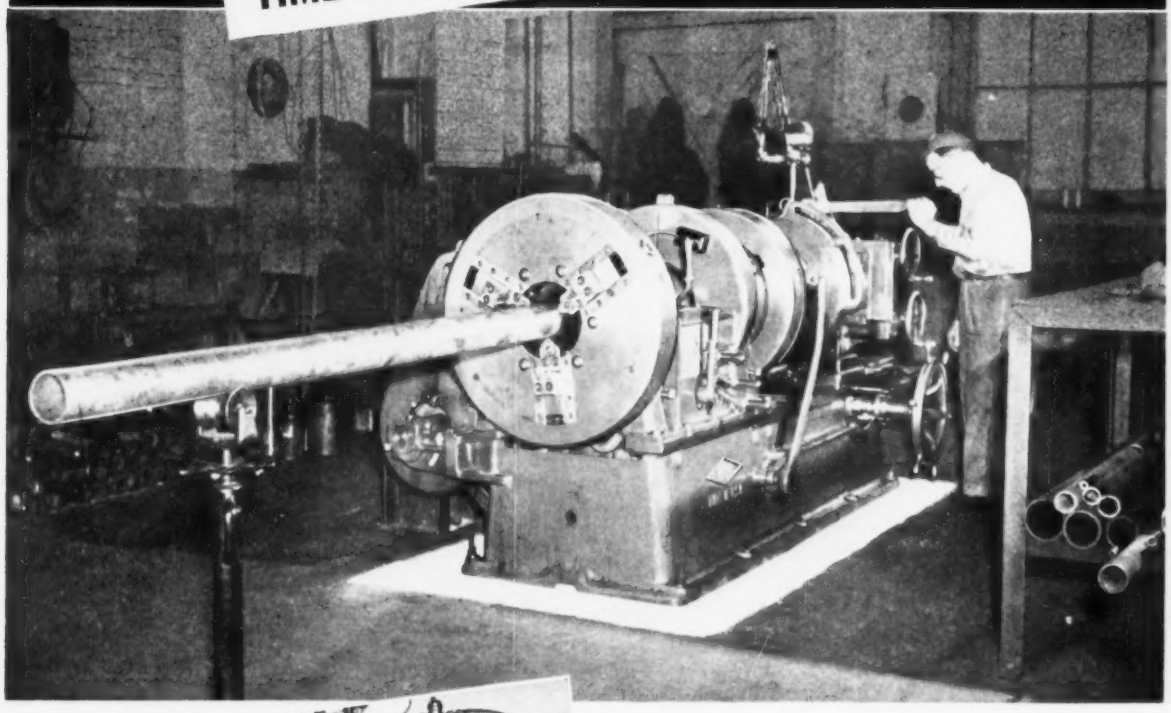
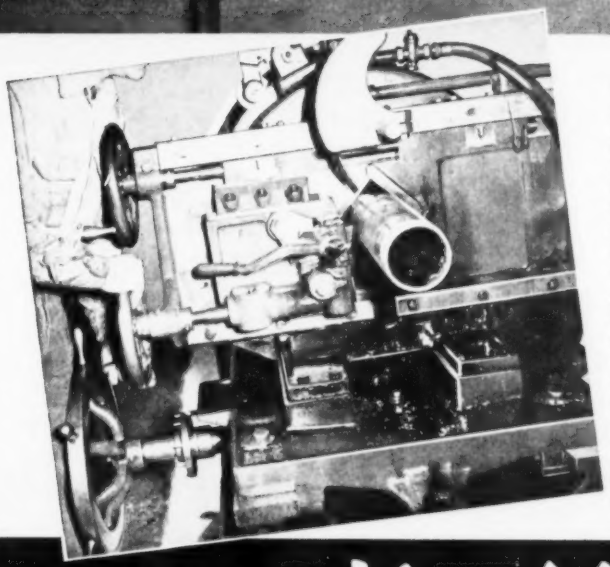
VERSATILITY

Saves TIME & MONEY in Maintenance Shops





Photographs show a Landis Pipe Threading Machine installation in a Job Shop of the New York Central Railroad. This shop, located at Weehawken, New Jersey, operates as a Marine Repair Shop handling maintenance for tugs, barges, lighters, etc. Illustrations show wrought iron pipe being cut off after reaming and threading. Standard pipe threads are cut 1½" long on the 4" pipe, using a cutting speed of 25 surface feet per minute. This machine is also used for cutting boiler tubes to length.

The wide diametrical range of the die heads and the use of patented tangential pipe chasers gives these machines a versatility invaluable in maintenance work. For example, the 6" Landis Pipe Threading Machine illustrated threads all pipe sizes from 1" to 6", inclusive. Size adjustment of the die head is simple and quick. Chasers need not be changed except for threads of a different pitch, form, or taper. Chasers are interchangeable and need only be replaced singly as needed. Tangential cutting action reduces wear, and chasers can be reground to use over 80% of their length. Write for Bulletin C-61.

LANDIS *Machine* COMPANY

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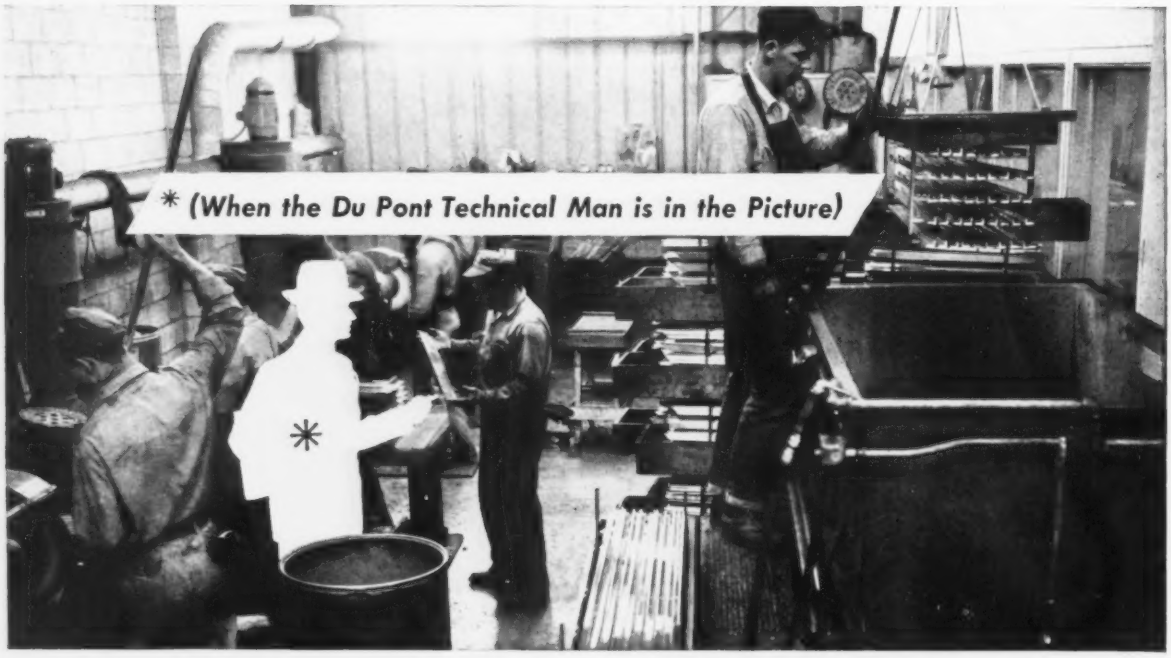
You Get Practical Help on Vapor Degreasing of Metals



Your Du Pont technical man and your distributor for "Triclene" D trichlorethylene are but a phone call away when you need fast, practical help in vapor degreasing.

The broad experience of the Du Pont Technical Representative and the skill and facilities of Du Pont research and laboratories assure you of the finest in technical help. The Du Pont technical man's job is to help you keep your vapor degreasing at top efficiency—whether a complete analysis of your operation is required, or a quick solution to an immediate problem.

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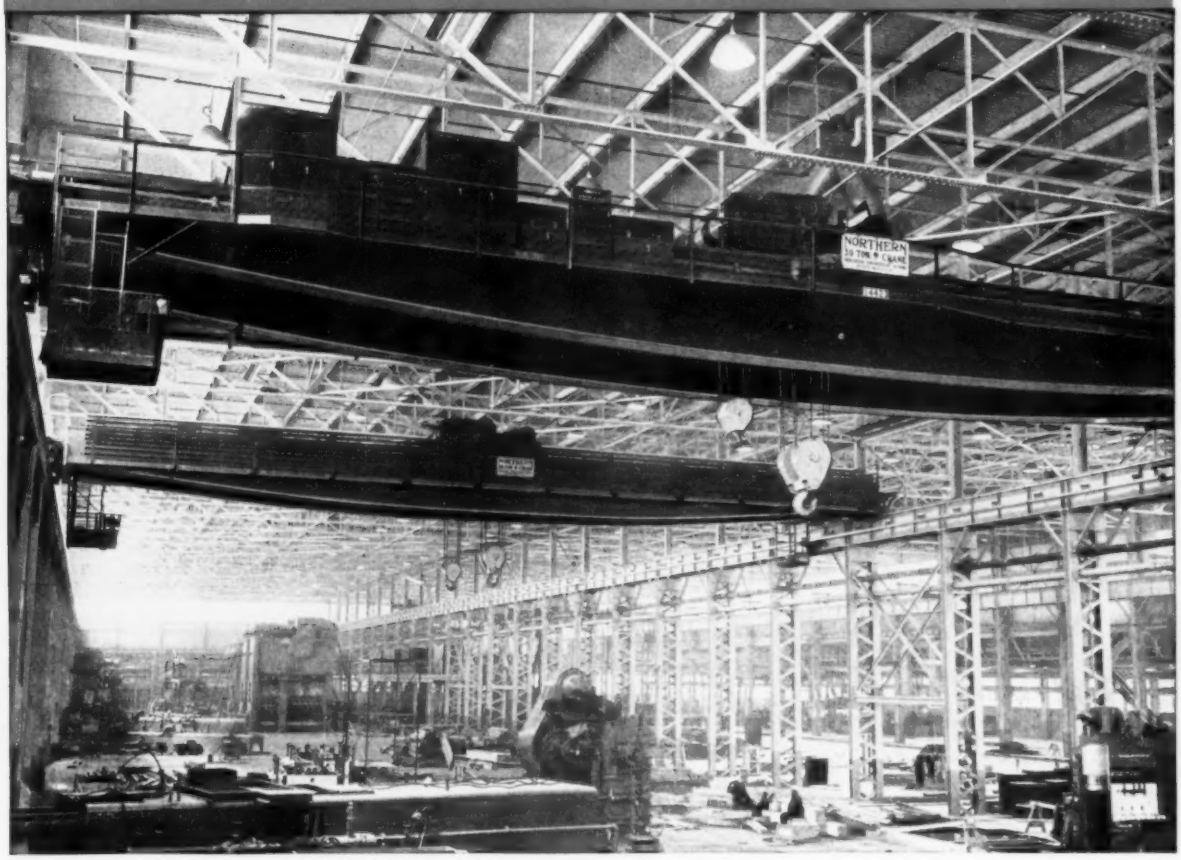
Look Overhead··· see "NORTHERN"



these notable twins assure dependability

LOCATION — *Press bay of a large, new plant manufacturing rear axle parts and components for automobiles and trucks.*

SPAN — *96 feet 10 inches, centers of runways.*

CAPACITY — *30-tons on Main Hooks, 10-tons on auxiliary hooks.*

ELECTRICAL EQUIPMENT — *60-HP motors on Main Hoist, Auxiliary Hoist and Bridge Travel, and 15-HP motor on Trolley Travel, with full magnetic control and direct current on brakes.*

ADVANTAGES—These twin NORTHERN cranes serve twin heavy press lines located at each end of the press bay. Designed for heavy duty requirements with compensating type bridge end trucks, and equally suitable electrical equipment and controls, they dependably and safely speed machinery installation or relocation, and assure smooth, uninterrupted flow of work in today's and tomorrow's automated production.

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NORTHERN MATERIAL HANDLING EQUIPMENT

NORTHERN ENGINEERING WORKS
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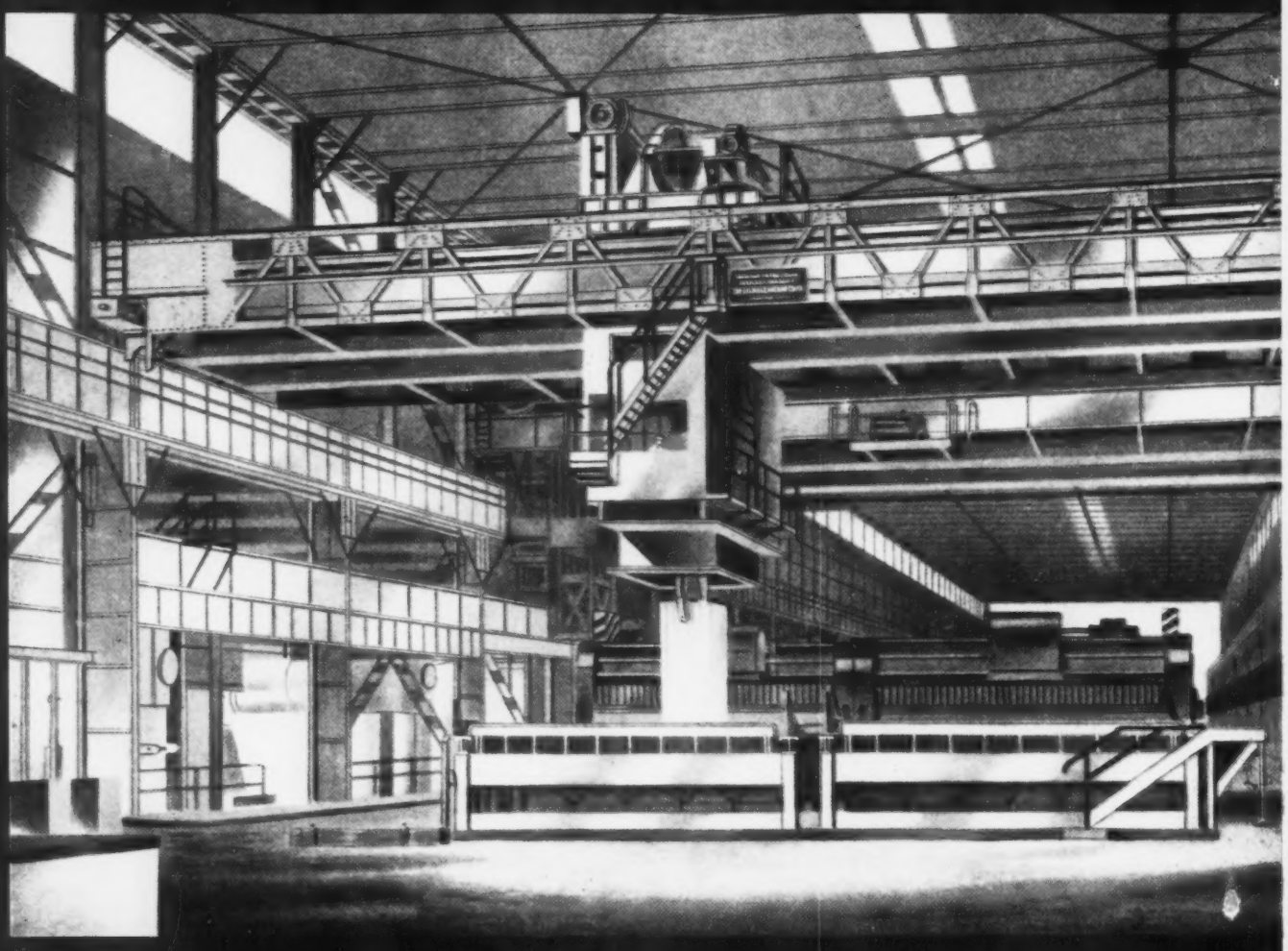
INTENSIFIED GRIP...



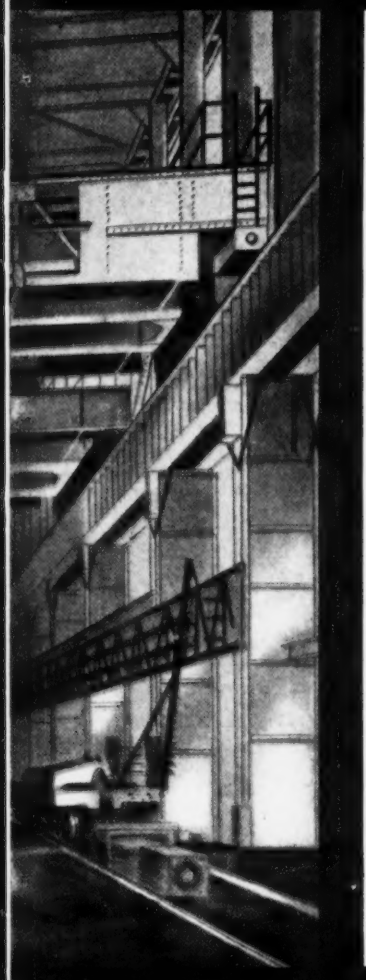
The tong grip of the conventional soaking pit crane depends *solely* on the weight of the ingot and when the weight of the ingot is removed, as in the case of placing an ingot on an approach mill table, the grip is reduced to zero and the ingot drops.

The tongs' grip of the Alliance intensified grip soaking pit crane is produced by the weight of the column *plus* the weight of the ingot. Since the weight of the column is usually equal to the weight of the ingot, the intensified grip soaking pit crane has the same grip *without* an ingot in the tongs as a conventional soaking pit crane has with an ingot, and *twice as much grip* as the conventional soaking pit crane when handling an ingot.

These intensified grip soaking pit cranes are built to handle ingots of any size and weight and incorporate all modern safety features. We welcome the opportunity to assist in solving your material-handling problems.

THE ALLIANCE MACHINE COMPANY

for Soaking Pit Cranes



The intensified grip soaking pit crane was developed by The Alliance Machine Company to hold ingots more firmly in the tongs and prevent dropping of ingots when they are placed on the mill approach table, ingot chariot or in the soaking pits. This is an exclusive Alliance feature.

Alliance

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• Note the reasons why a 1957 line of 22-foot pleasure cruisers features gleaming stainless steel handrails:

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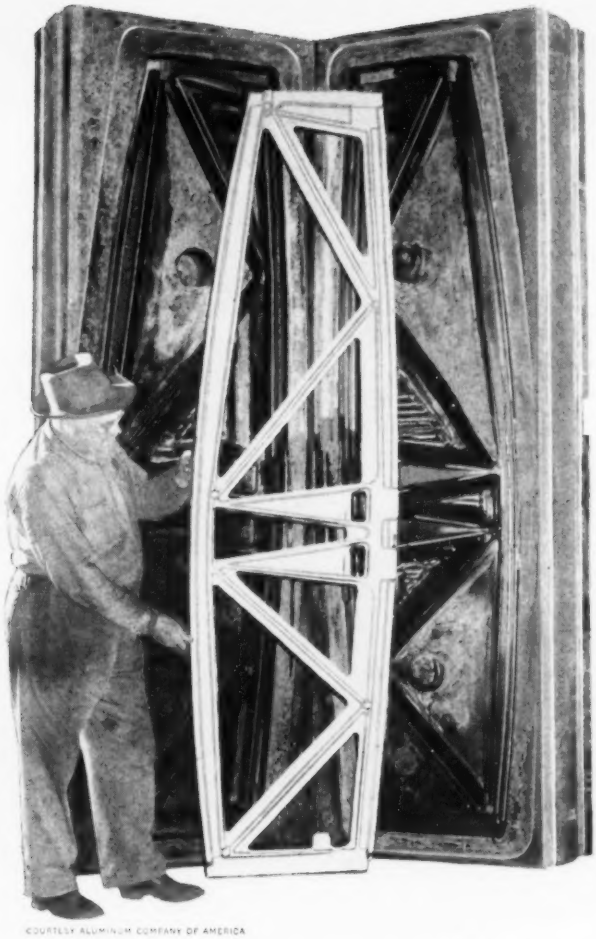
more than corrosion resistance

Stainless Tubing & Pipe



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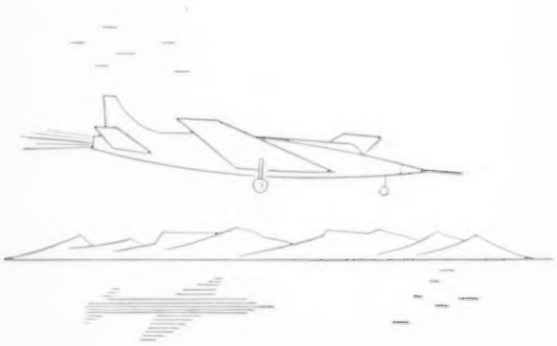

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Finkl FX die blocks are noted for their long production runs and economy because:

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- FX Special Machining Quality appreciably reduces shanking and sinking time.

These proved advantages can also mean savings to you with more pieces per die and better deliveries to your customers.

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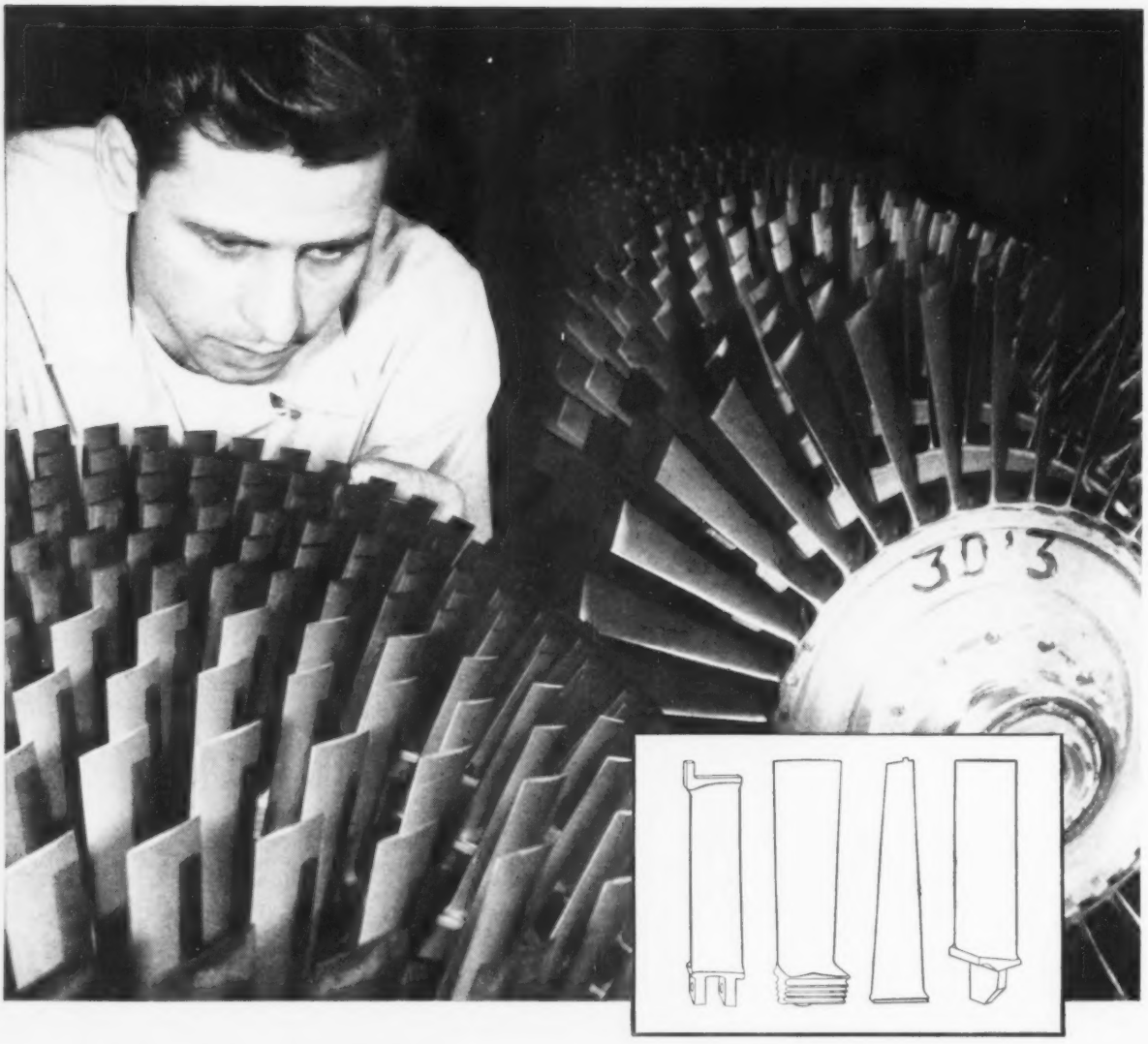

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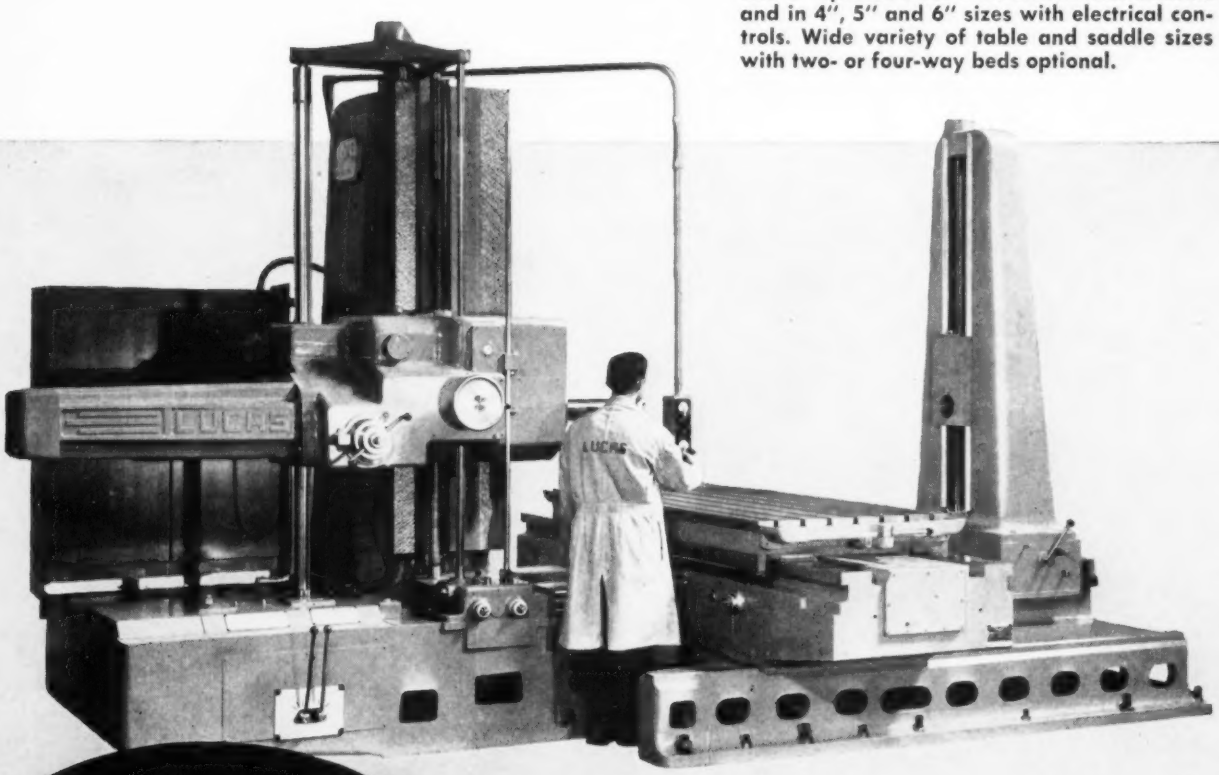

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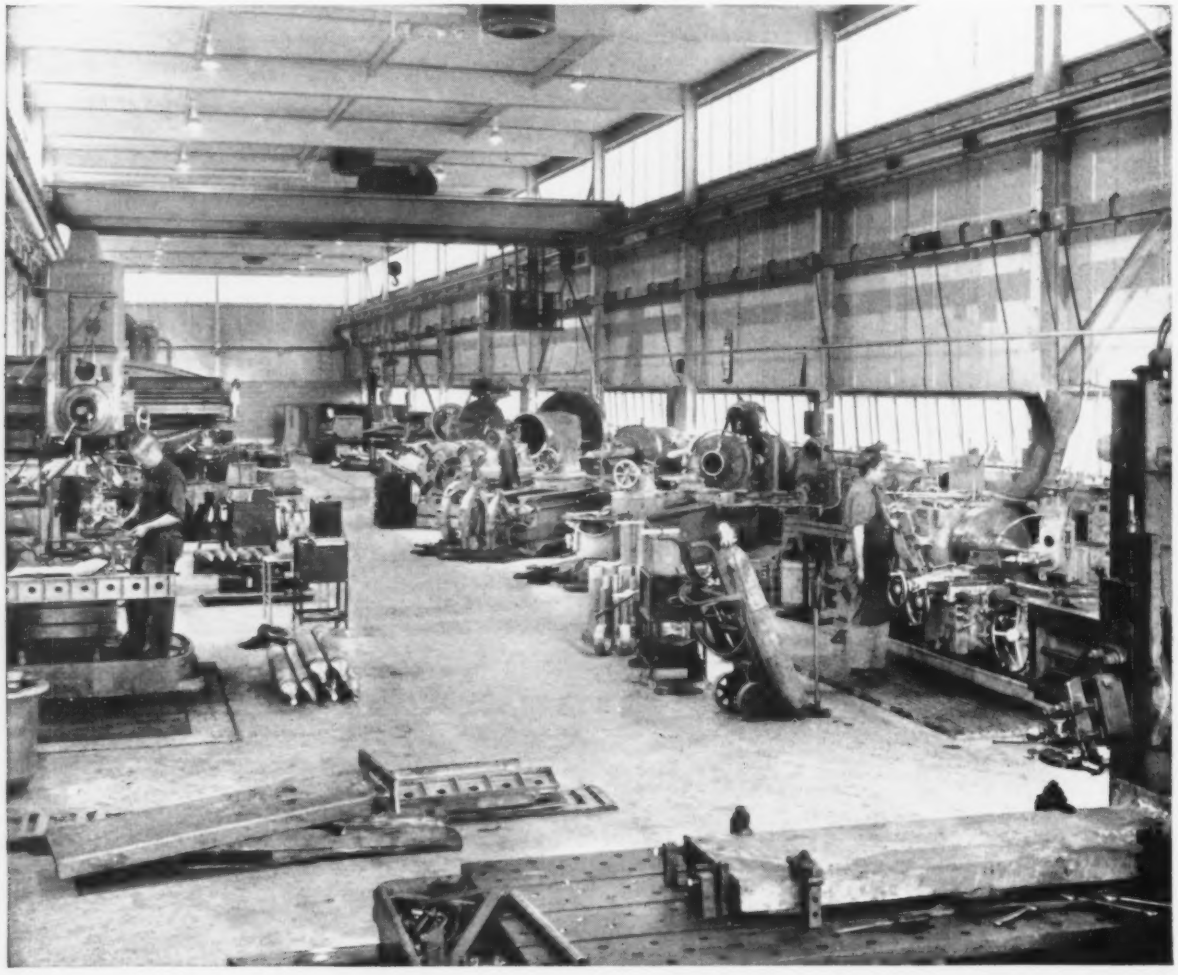
Why not take advantage of these enlarged, modern facilities on your next high alloy casting job? Call your nearest Electro-Alloys representative, or write us direct for information and quotes. Electro-Alloys Division, 8015 Taylor Street, Elyria, Ohio.

*Reg. U.S. Pat. Off.

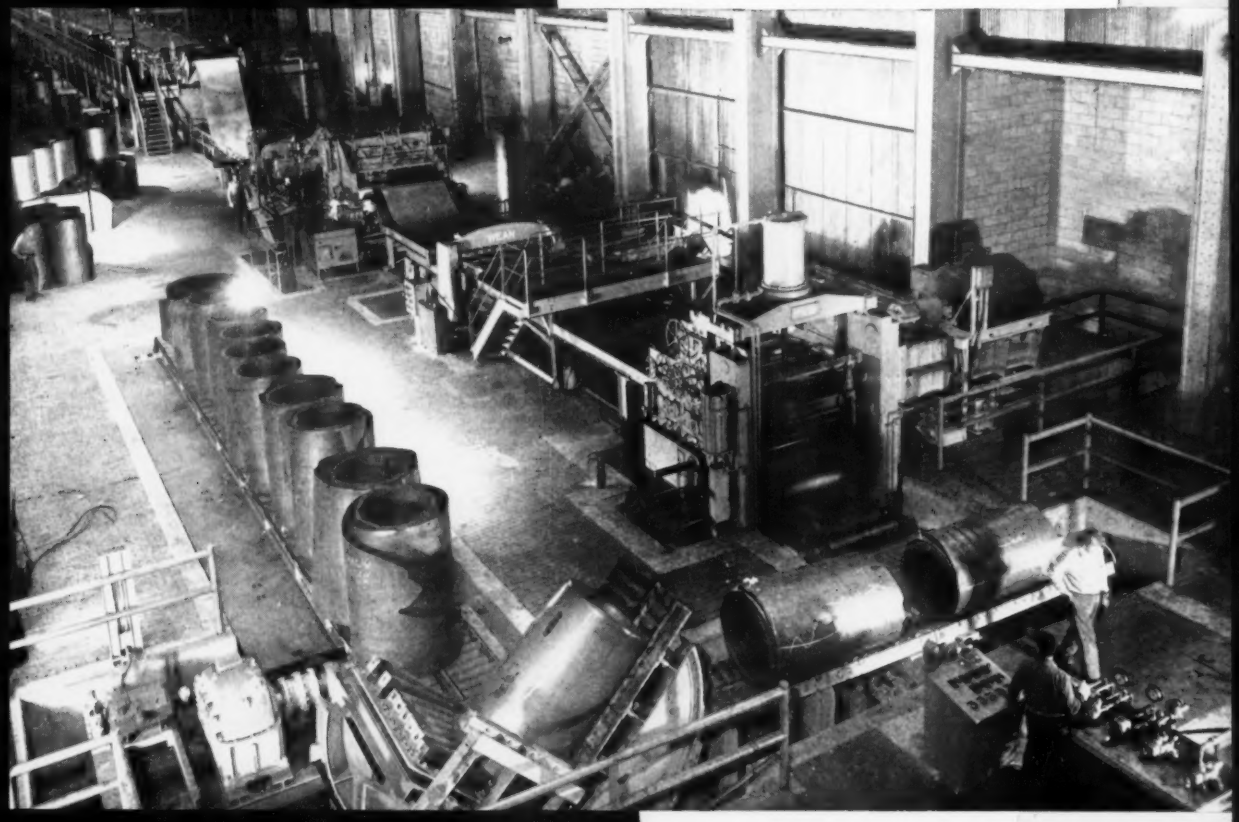


AMERICAN Brake Shoe COMPANY

ELECTRO-ALLOYS DIVISION Elyria, Ohio

HOW WEAN CREATIVE ENGINEERING

improves continuous Strip Pickling



FASTER, more uniform pickling at reduced costs — that's why leading steel producers prefer Wean Continuous Strip Pickling Lines. From the McKay Processing Uncoiler to recoiling, the Wean line is engineered to deliver highest quality at greatest speed.

WEAN

THE WEAN ENGINEERING COMPANY INC., WARREN, OHIO

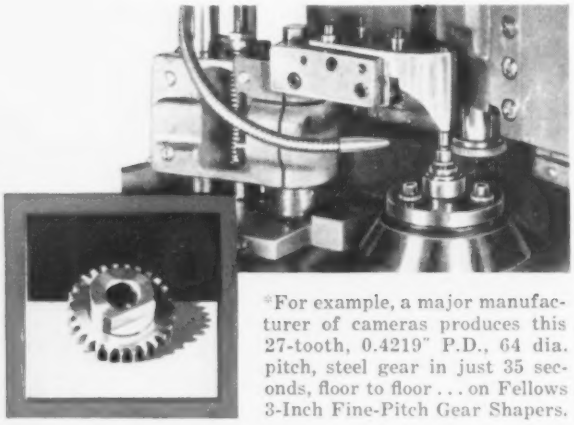
GEARED to capture a moment of life!

Stereo pictures are easy...for the people who take them. Simple adjustments, the snap of a shutter control...and a moment of life is permanently recorded in natural color and three-dimensions!

But making the cameras to do this put new demands on manufacturers, for each stereo camera is two in one. Two lenses must be focused at once, two apertures set, two shutters must be operated precisely in unison... and the mechanism, though accurate, must be inexpensive.

Cutting gears that meet the requirements for these cameras is a job for Fellows machines. In many plants manufacturing still and motion picture cameras and projectors, standard Fellows Fine-Pitch Gear Shapers combine the necessary precision with low cost and high production rates, not only on gears but on non-involute parts.*

To combine accuracy with high production rates, look to the complete Precision Line of Fellows gear production equipment. Fellows Gear Shapers are available in a full range of capacities from 1/16" to 120" P.D. Write, wire, or phone any Fellows office.

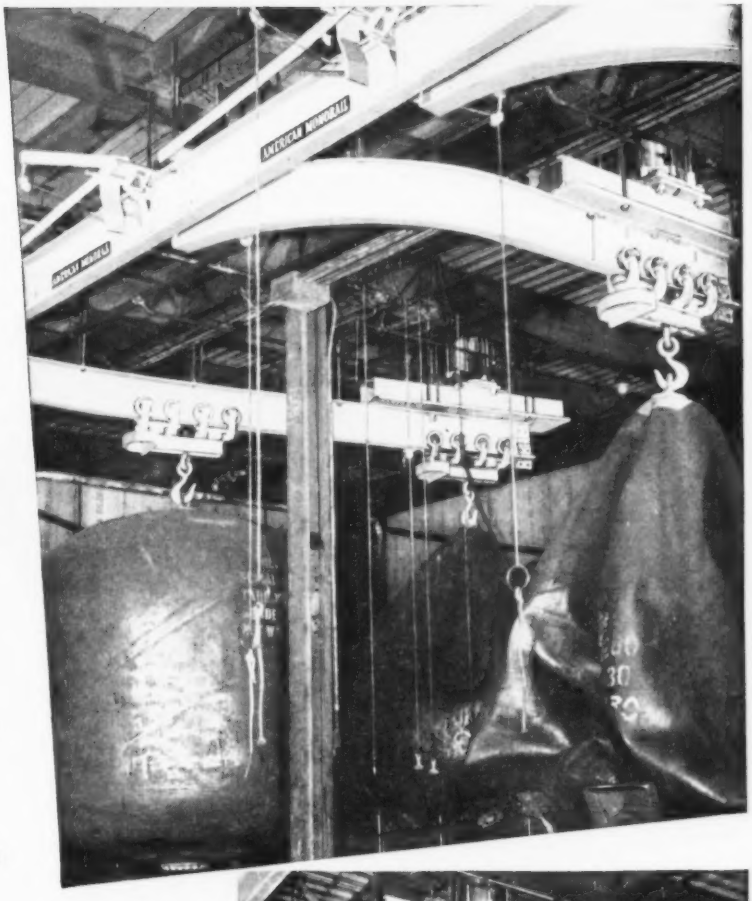


*For example, a major manufacturer of cameras produces this 27-tooth, 0.4219" P.D., 64 dia. pitch, steel gear in just 35 seconds, floor to floor . . . on Fellows 3-Inch Fine-Pitch Gear Shapers.

THE FELLOWS GEAR SHAPER COMPANY
78 River Street, Springfield, Vermont
Branch Offices:
1048 North Woodward Ave., Royal Oak, Mich.
150 West Pleasant Ave., Maywood, N. J.
5835 West North Avenue, Chicago 39
6214 West Manchester Ave., Los Angeles 45

THE PRECISION LINE *Fellows* *Gear Production Equipment*

Teamed Engineering for EFFICIENT SEALDBULK HANDLING



U. S. Rubber Company and American MonoRail Engineers teamed up to develop this system.

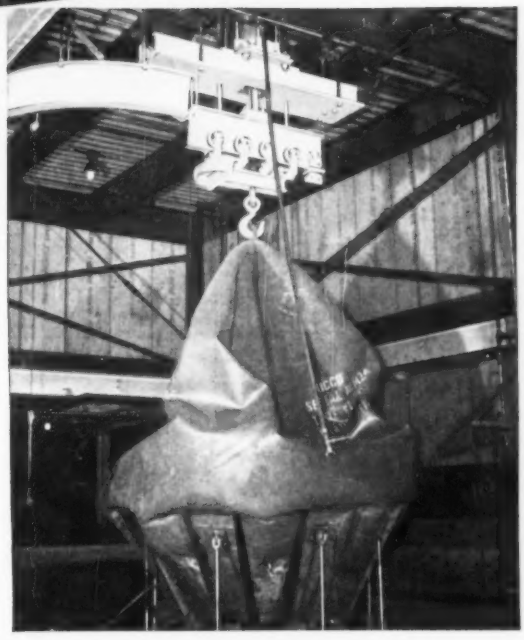
The Sealdbin containers, a product of U. S. Rubber Co., each hold 11,000 pounds of costly carbon black. This American MonoRail System moves the Sealdbins from flat cars or trucks to special stations for discharge. Empty deflated containers are returned to the supplier for re-use.

Working together this expert team has minimized manual labor, time, and waste.

If you have a materials handling problem, call your nearby MonoRail Engineer or write us.

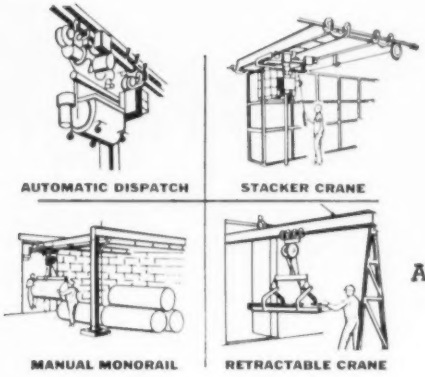
Send for Bulletin C-1.

US RUBBER



Member of Materials Handling Institute and MonoRail Mfrs. Assn.

For Power Driven Conveyors, Use Landahl Chainless Conveyors

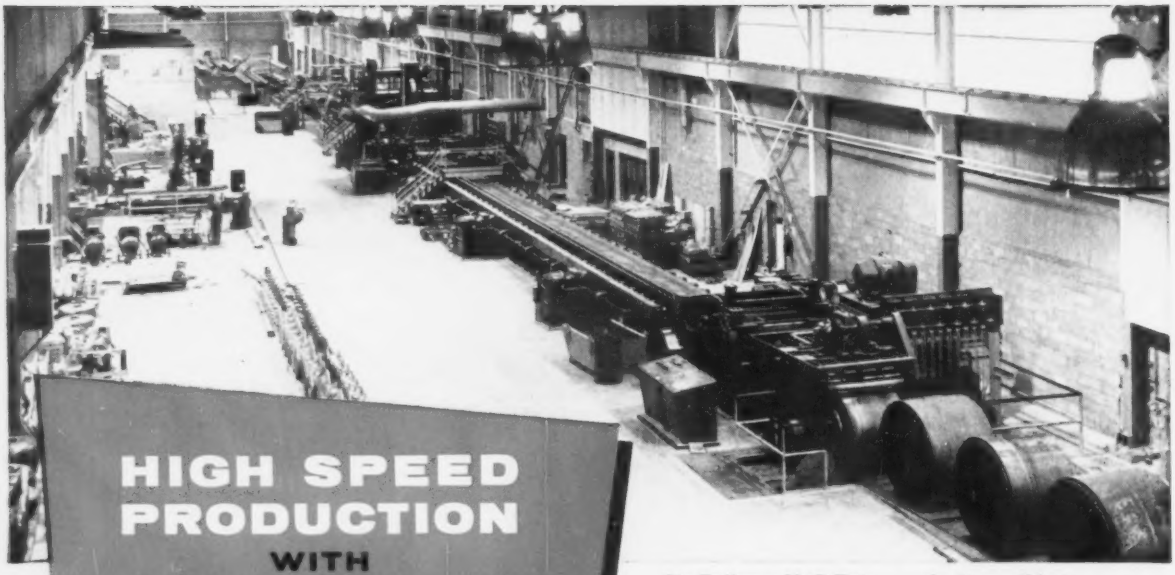


AMERICAN MONORAIL COMPANY

OVERHEAD HANDLING EQUIPMENT

13103 ATHENS AVENUE • CLEVELAND 7, OHIO

(IN CANADA—CANADIAN MONORAIL CO., LTD., GALT, ONT.)



HIGH SPEED PRODUCTION WITH RELIANCE V★S DRIVES

Six Reliance V★S Drives make it possible to operate this complete line as if it were a single machine.

Carloads of pipe are pouring out of the new Edmonton, Alberta plant of Alberta Phoenix Tube & Pipe, Ltd. This $6.5 million installation is producing pipe at unprecedented rates.

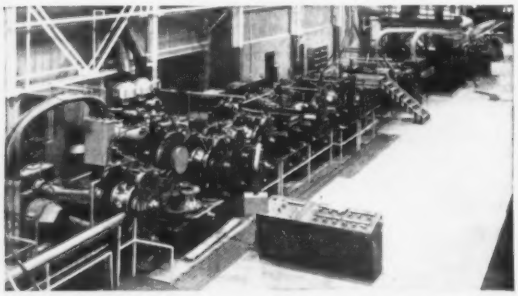
Volume pipe production requires something special in a drive system—one that furnishes precise speed control and instantaneous motor response. A wide stepless range of speeds is provided to handle various pipe diameters and lengths, and all sections of the line operate at the same relative speed.

A team of Reliance Application Engineers, working with the machinery builder, built this specialized drive. This team knows the processes of the steel industry and how to handle the problems involved. Engineering knowledge, backed by the quality of Reliance products, supplied this accurate, simple-to-operate, economical drive.

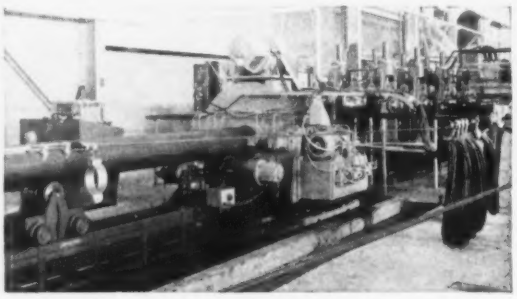
The Reliance Application Engineering Department builds drives for every industry. A team of engineers who are experts on your industry's operation, stand ready to engineer and build the drive for your particular needs.

If you would like more information on this installation, write for Bulletin L-2505.

L-1841



The welding section operator controls the speed of the entire line from this Reliance Pendent Station.

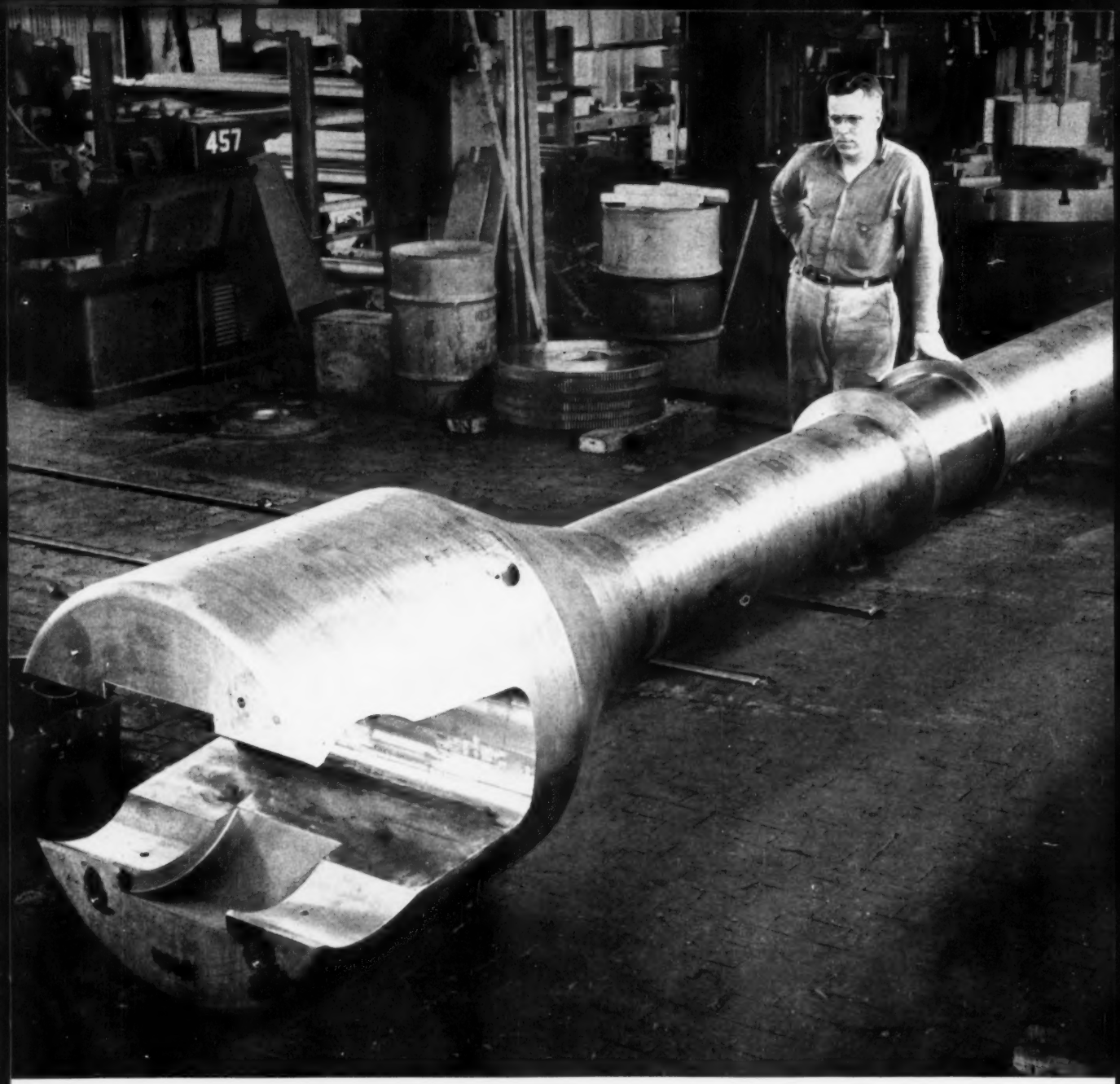


The Reliance V★S Drive on this flying cutoff automatically measures the pipe and controls the movement and speed of the carriage.

RELIANCE ELECTRIC AND ENGINEERING CO.

DEPT. 25A, CLEVELAND 17, OHIO · CANDIAN DIVISION: WELLAND, ONTARIO

Sales Offices and Distributors in Principal Cities



WHO FORGES THE TOUGH ONES? & machines them, too

You're looking at a universal spindle and coupling for a 38″ slabbing mill. It's nearly 20 feet long and weighs 20,000 pounds. That's a lot of forging—*and we made it!*

The trade knows us as *specialists* in forgings of this large size. We have the experience, specialized talent, and the kind of equipment needed to make couplings, crankshafts, or any other large-size forging, from the basic electric steel to the finished machined part . . . all done in our completely integrated plant.

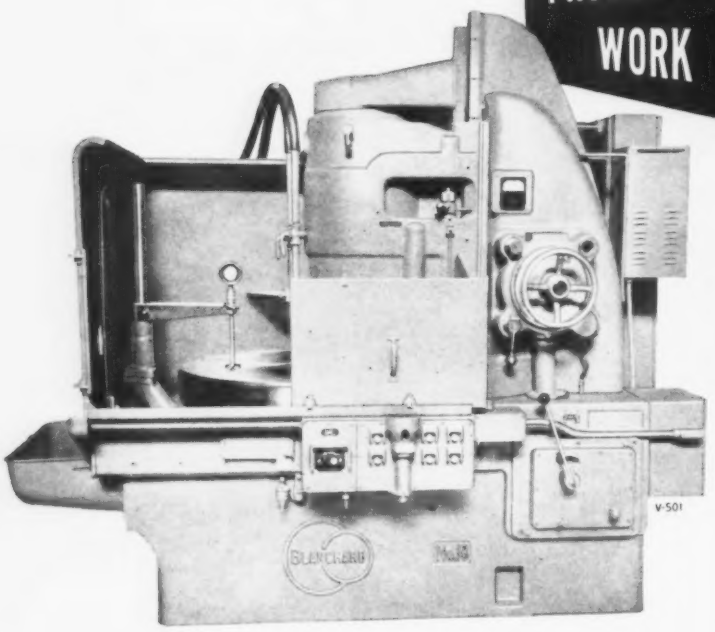
This is our specialty—large commercial forgings. Yes, for over 43 years the trade's answer to "who forges and machines the tough ones . . . best" has been

NATIONAL FORGE
AND ORDNANCE COMPANY
IRVINE (WARREN COUNTY), PENNSYLVANIA

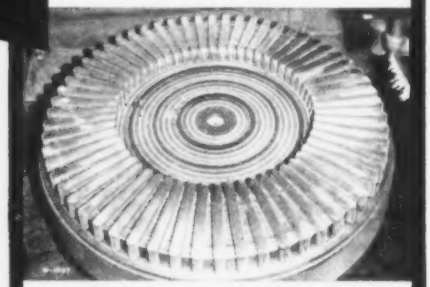
To see more of "the tough ones," and the machinery they're made on, write for Bulletin NFO-1.

for BEST results in surface grinding...
PUT IT ON THE BLANCHARD

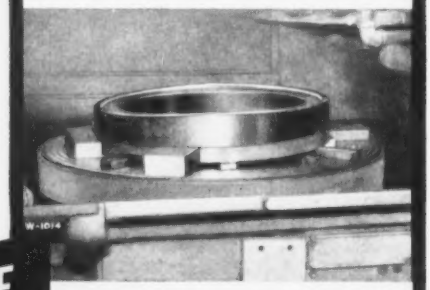
PRODUCTION WORK



SIDE PLATES. 9" x 18" plates ground from rough on No. 18 Blanchard with 36" chuck. Stock removal 1/16" to 1/8" per side. Held flat within .003", parallel to .001", and to dimension tolerance of ±.001". Production: 30 surfaces per hour.

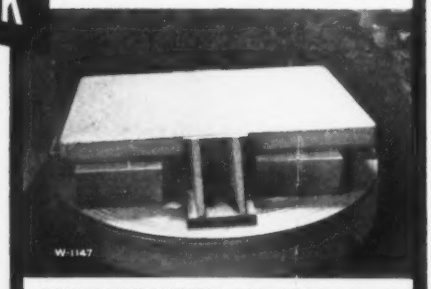


CONNECTING LEVERS. Cast iron levers ground in special magnetic fixture with pins located in "vee's". Stock removal per side is 1/32" to 1/16"; must be flat and at right angles to pins. No. 13 production: 180 pieces per hour, compared to 20 pieces per hour by former method used.



MAINTENANCE AND ODD LOT WORK

HARDENED STEEL PUNCHES. This 24-13/16" dia. punch, reground on a No. 18, is centered radially on 36" magnetic chuck. Duplicate circumferential and radial shear reliefs are generated with two setups.



GRANITE SURFACE PLATES. A No. 13 Blanchard reconditions this 18" x 34" granite surface plate by grinding it flat within .0002". 3/16" of stock is removed in 5 hours.

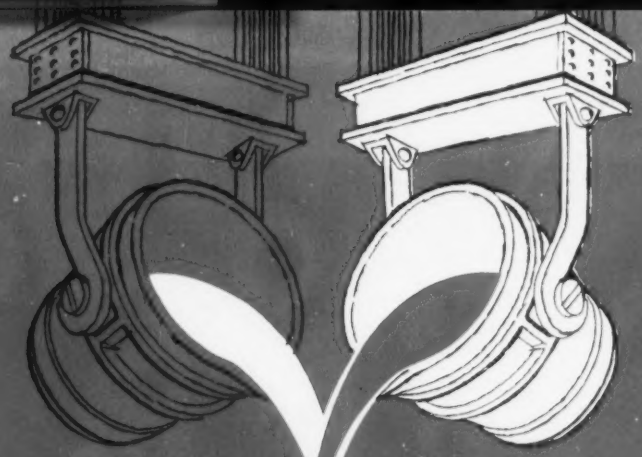
Blanchard Grinders are used throughout industry on surface grinding jobs that demand the utmost in production, finish and accuracy.

Whatever *you're* surface grinding, there's a Blanchard designed to do the job speedily and accurately.

PUT IT ON THE **BLANCHARD**

Send for free copies of "Work done on the Blanchard", fifth edition, and "The Art of Blanchard Surface Grinding".

THE BLANCHARD MACHINE COMPANY
64 STATE ST., CAMBRIDGE 39, MASS., U. S. A.



For better service to you Jessop acquires Green River Steel Corporation

Green River Steel Corporation of Owensboro, Kentucky, one of the newest alloy steel plants in the country, now is a wholly-owned subsidiary of Jessop Steel Company. This fact will result in benefits to the customers of both companies. If you buy steel from Jessop, you have been buying the broadest variety of top quality alloy, high-speed and stainless steels obtainable anywhere. Now with the splendid new and modern melting facilities of Green River in the picture, service from Jessop will be broader and quicker. If you are a Green River customer, you'll enjoy higher quality and more products and the benefits of the exclusive Dornin Process used by Green River which provides steel of unmatched forging qualities and grain structure. If you haven't been buying from either company, this is a good time to start. Write to Jessop.

These Jessop district offices and representatives can now service you with Green River Products

District Offices
Birmingham, Ala.
Chicago, Ill.
Cincinnati, Ohio
Cleveland, Ohio
Detroit, Mich.
Hartford, Conn.
Indianapolis, Ind.
Los Angeles, Cal.
New York, N.Y.
Philadelphia, Pa.
Pittsburgh, Pa.
Toronto, Canada
Wallaceberg, Canada
Washington, D.C.

Representatives
Charlotte, N.C.
Kansas City, Mo.
Milwaukee, Wis.
St. Louis, Mo.
Utica, N.Y.

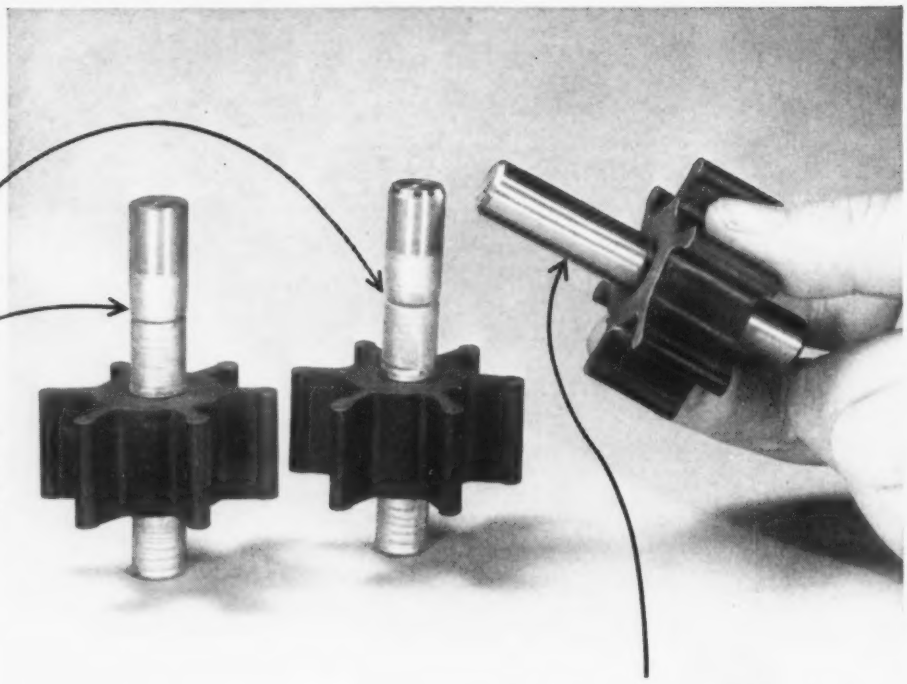
JESSOP

STEEL COMPANY • WASHINGTON, PA.

OFFICES IN PRINCIPAL CITIES

Jessop Steel of Canada Limited, Wallaceburg, Toronto

Jessop Steel International Corp., Chrysler Building, New York, New York



SHAFTS WHICH FAILED AFTER 45 MINUTES.
Both are made of premium metals, one ferrous, one non-ferrous.

TITANIUM SHAFT—*after two months no sign of corrosion.*

TITANIUM PUMP SHAFT LASTS

...where other metals corroded in 45 minutes

The problem was to pump ferric chloride, an acid used in etching printed circuits in electronics manufacturing. Jabsco Pump Company, of Burbank, California, sought to develop a pump to handle this highly corrosive acid, and replace batch handling.

Premium metals were tried for the pump shaft (the impeller is neoprene and the casing is plastic), but corrosion around the seal almost immediately led to leakage and failure. A glass shaft did not have sufficient strength. Then, using Mallory-Sharon commercially pure titanium for the shaft, the problem was solved—permanently. Titanium has outstanding resistance to chlorides.

The cost figures here are illuminating. The pump with the titanium shaft cost about double the pump with the ferrous metal shaft . . . and about the same as the pump with the other non-ferrous metal shaft (because of machining difficulty with the latter). So first cost of titanium is lower than you may think. And titanium paid for itself in *90 minutes*.

Let us help you apply titanium to your corrosion problems . . . our service engineering group will be glad to assist. For information, write Dept. R-6.

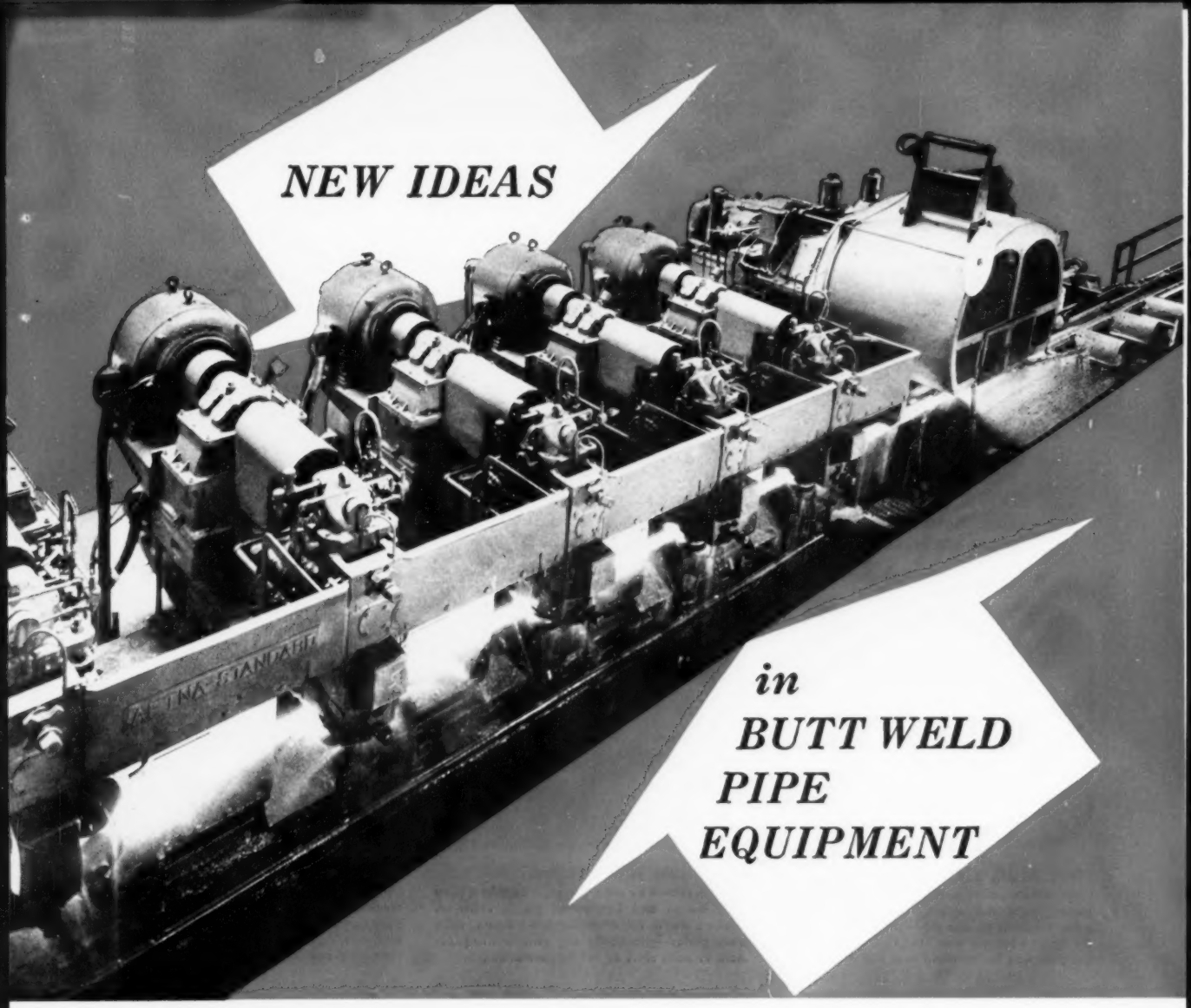
TYPICAL PRESENT APPLICATIONS OF TITANIUM

Anodizing racks	Impellers
Condenser inserts	Piping
Filters	Process vessels
Heat exchangers	Steam jet diffusers

MALLORY Ti SHARON

MALLORY-SHARON TITANIUM CORPORATION · NILES, OHIO

Producers of titanium and titanium alloy sheet, strip, plate, rod, bar, billets



UNCOILER-LEVELLER . . . Equipment includes automatic handling, weighing, storage, and uncoiling of coiled skelp ahead of flash welder. One man operation. Improved leveller has skelp deflector roll, adjustable independent of leveller roll bank.

ROTARY FLYING HOT SAW . . . Saw adjustments can be made to select any cutting length without reducing delivery speed from mill. Saw adjustment permits cutting single pipe lengths from 18 feet to 60 feet.

AUTOMATIC PIPE SELECTOR releases pipe at predetermined intervals. Controls gap between consecutive lengths of pipe. Eliminates overlapping of pipes as they enter Straightener. Eliminates need for operator to regulate continuous flow of pipe.

TRAVELING CRADLES facilitate removal of crane lifts of pipe from the line of production to maintain full mill efficiency.

POSITIVE TRANSFER of pipe from Screw Type Kickoff, following Sizing Mill, to Screw Type Cooling Bed.

AETNA • STANDARD

THE AETNA-STANDARD ENGINEERING COMPANY

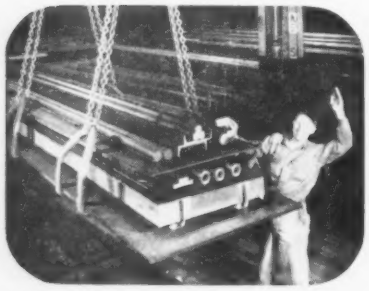
GENERAL OFFICES: PITTSBURGH, PA. **PLANTS: ELLWOOD CITY, PA., WARREN, OHIO**

CONTINUOUS GALVANIZING LINES • CONTINUOUS ELECTROLYTIC TINNING LINES • SIDE TRIMMING AND SHEAR LINES AND OTHER FINISHING EQUIPMENT • CONTINUOUS BUTT WELD PIPE MILLS • SEAMLESS TUBE MILLS • DRAWBENCHES AND OTHER COLD DRAW EQUIPMENT • ROLLS AND CASTINGS • EXTRUDERS, MILLS, PRESSES FOR RUBBER AND PLASTIC

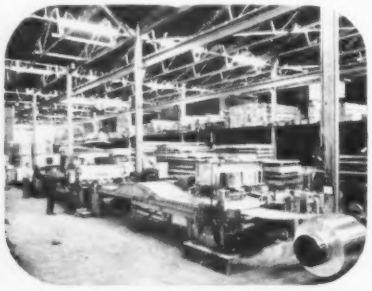
Six ways
Ryerson can serve you

Chances are that when you think of steel from stock, Ryerson springs first to mind. And for good reason. Every kind of steel, every shape and size, is immediately available from our tremendous reservoir.

But perhaps you don't always remember that Ryerson offers you much more—many other important products and services such as aluminum, plastics and fabricated construction steel. The pictures below illustrate the extent of our service. For a complete listing see the familiar red Ryerson catalog. Then as your needs arise—or whenever you have a question of selection, fabrication or application—look to Ryerson as your most complete and dependable source of help.

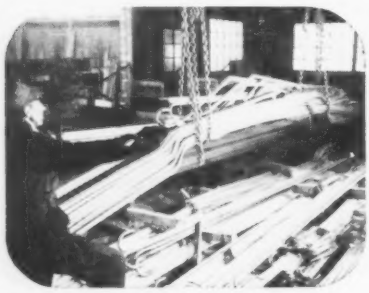


STEEL FROM STOCK
Carbon steels, alloys, stainless—bars, structurals, plates, sheet and strip, tubing—you can get quick shipment of one piece or truckloads from the world's largest steel stocks, at Ryerson. Get the steel with the certified seal—of quality.

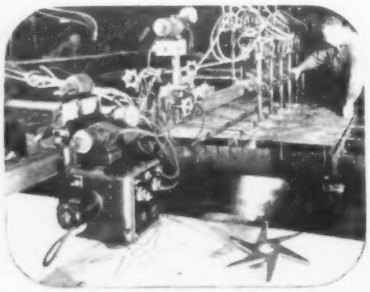


ALUMINUM FROM STOCK
In areas served by our Chicago, Milwaukee, New York, Boston and Connecticut plants, draw on Ryerson stocks for aluminum too—sheets, coils, bars, plates—practically any aluminum requirement in stock sizes or cut to your order.

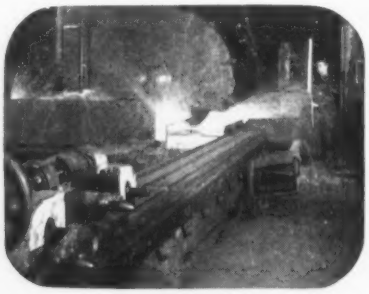
PLASTICS FROM STOCK
The convenience and dependability of Ryerson service is also available to buyers of industrial plastics—PVC pipe, valves and fittings, sheets and rods, rigid Kralastic pipe, flexible polyethylene pipe and tubing, etc.



FABRICATED CONSTRUCTION STEEL
Re-bars, spirals, etc. for reinforced concrete construction are fabricated at Ryerson plants from coast to coast. Also, at Chicago, Ryerson fabricates structural steel for the framework of buildings, bridges, etc.



FLAME CUT STEEL SHAPES
Your nearby Ryerson plant can quickly flame cut almost any shape from carbon, alloy or stainless steel—producing a single piece or thousands accurate to size and ready for your application. We take the work load—you save money.



MACHINERY AND TOOLS
The broadest line of metal-working equipment available from a single source is offered by the Ryerson Machinery and Tool Division. You can choose from thousands of types and sizes produced by nearly one hundred manufacturers.

RYERSON STEEL

In stock: Carbon, alloy and stainless steel—bars, structurals, plates, sheets, tubing, industrial plastics, machinery & tools, etc.

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • WALLINGFORD, CONN. • PHILADELPHIA • CHARLOTTE • CINCINNATI CLEVELAND • DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

Pipe Supply May Tighten

Two huge gas pipeline projects are pending. If they're approved by the Federal Power Commission, it will mean still more pressure on already-tight pipe supplies. One proposal calls for converting the famous "Little Inch" line to carry oil, will mean building a substitute line from the Southwest to the East Coast. Dispute over the other proposal to run a line from Louisiana to the Minnesota-Canada border should be settled soon, also.

Autos Won't Get Bigger

Although the competitive situation could change the picture overnight, most informed observers feel the passenger auto has about reached its maximum size. This means that steel requirements per car will probably not change much, although some increased use of glass and aluminum will be a factor.

Helps Solder Aluminum

Soldering connections to aluminum bus bars and electrical cables isn't the easiest job in the world. But one grinding wheel manufacturer hopes to simplify the task with a flux-impregnated abrasive wheel. In theory, the wheel would deposit an oxide-resistant substance in aluminum surfaces as they're ground prior to soldering. Surfaces prepared in this way would speed field assembly and erection of aluminum power transmission lines, for example.

Mills Like Punched Cards

Steel mills are going all out for punched-card programming of rolling mill operations. Allegheny Ludlum and Jones & Laughlin recently announced the use of card control on reversing roughers. Within the next year, at least eight mills will be operating in this manner.

New Use for Vapor Plate

High purity aluminum, applied through vapor-plating techniques, shows promise of protecting magnesium from many types of corrosive attack. Air Force-sponsored research developed several vapor-plating methods. Most promising appears to be pyrolysis of aluminum alkyls and of aluminum hydride and its derivatives at low pressures and at temperatures of 400 to 500°C. The official research report is available for industry use.

Aluminum Price Boost Due?

Look for aluminum prices to go up on or about August 1. There has been no indication from producers but the industry's wages will be up at least 15 cents an hour by then—on top of a 3 cent cost-of-living increase earlier this year. Aluminum prices have not risen since last summer's 4 pct boost. True, the aluminum market is slack at the moment. But under similar conditions in the summer of 1954, producers raised the price ½ cent per lb.

Plate With White Brass

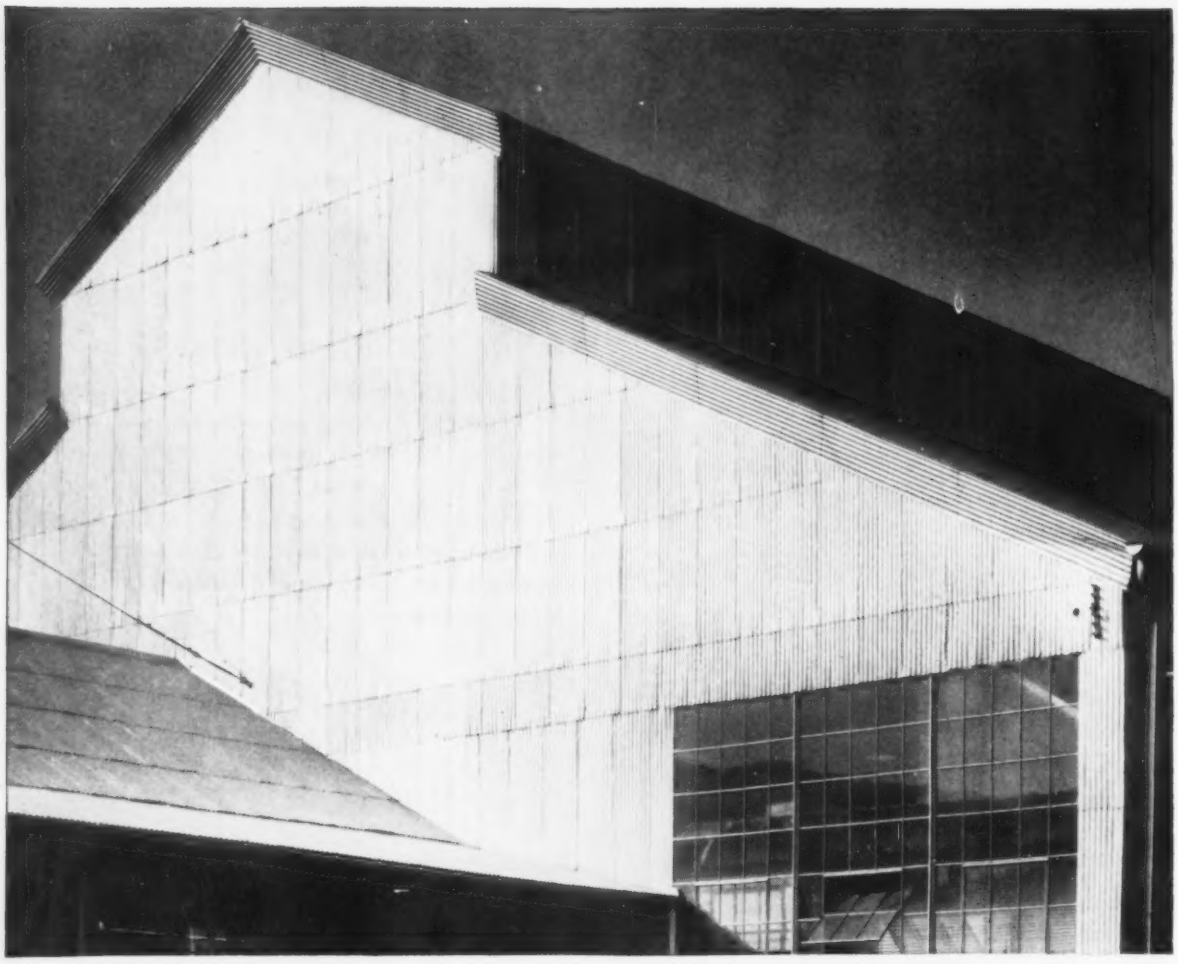
Platers haven't given up on white brass as a likely substitute for nickel undercoatings on parts subjected to outdoor exposure. They're checking other compositions than the 80 pct zinc-20 pct copper alloy. Latest word is that one of the "Big Three" auto makers is finding success with a 50 pct Zn-50 pct Cu alloy plating.

Navy Needs Tooling

Navy tests of a new, very advanced jet plane engine await special tooling and other equipment to make complete studies of the power plant. The Navy is asking Congress for $13 million to be used in the coming fiscal year to aid the test program. Hints indicate the engine will power a plane at exceptional speeds and at very high altitudes.

Link Metals and Plastics

Incredibly small particles of molecular alpha iron, compressed into useful shapes, cling together with a force that results in outstanding tensile strengths. Tests on iron-copper mixtures of these sub-micron size particles indicate a potential use as bearings that won't heat up or wear. Ford Motor Co. also checked some iron powder and nylon leaf spring inserts through 300,000 test cycles, reported no noise or wear.



ACP ANNOUNCES A NEW CHEMICAL PROCESS

that develops an excellent zinc phosphate coating on mill passivated galvanized stock

ACP research and development has solved another perplexing problem for its customers in the galvanizing industry—the formation of a good zinc phosphate coating on mill passivated galvanized stock. It offers excellent paint bonding characteristics. The treatment is performed in a 5-stage power spray washer or dip line normally used for coating nonpassivated stock.

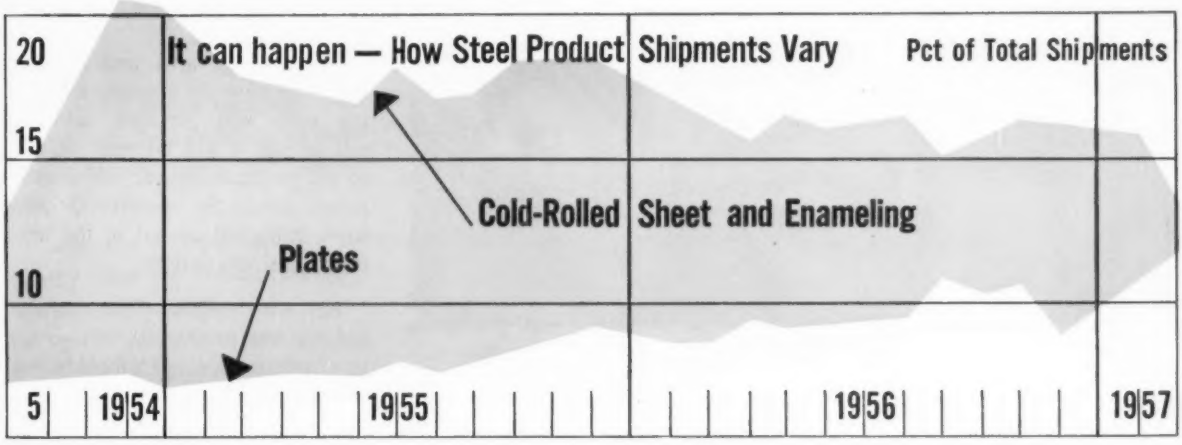
If you are having trouble getting a good zinc phosphate coating on your galvanized stock, consult us. We'll be glad to send you descriptive literature or have a technical representative call.

AMERICAN CHEMICAL PAINT COMPANY, Ambler 20, Pa.

DETROIT, MICH. • ST. JOSEPH, MO. • NILES, CALIF. • WINDSOR, ONT.

CHEMICALS ACP PROCESSES

New Chemical Horizons for Industry and Agriculture



What Steel Buyers Can Expect in a Changing Market

Product Mix May Shift From Hot to Cold

Steel mills do quite a lot of schedule juggling when demand starts an upswing.

Looking back at past records can be useful in planning which items to buy and when.

If your timing is right, you can take fullest advantage of mill offerings.—By G. J. McManus.

▪ If history repeats itself in the near future, steel buyers could face this prospect:

Plate shipments could drop by 2.5 million tons from the current annual rate; structural shipments could fall 1.5 million tons; cold-rolled sheet shipments could jump nearly 3 million tons. Hot-rolled sheet would go on a selective selling basis.

That's what would happen if 1955 market conditions and steel product mixes were applied to the present picture. The mills are putting a relatively high percentage of steel into heavy products now. They have an excess of finishing capacity and in a general pinch, would favor light products. Plates and structurals would get a smaller bite of the steel ingot.

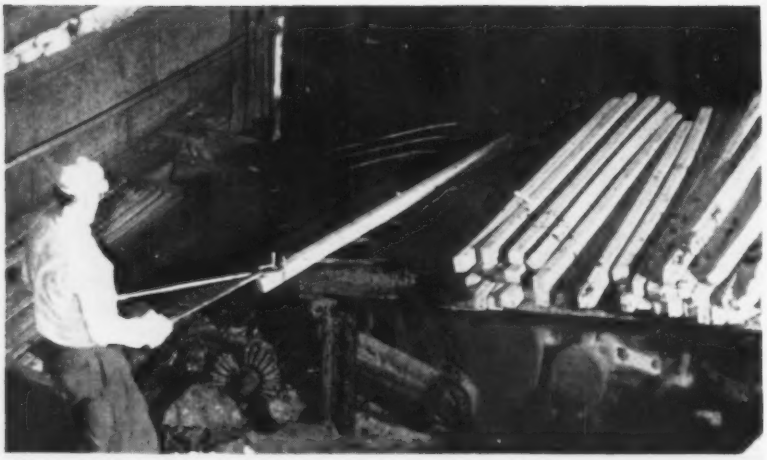
Timing Is Important — Smart purchasing men are well aware of this fact. They know that mills now rolling plate on strip mills would promptly switch back to light steel if the market strengthened. But they know also that product mix during a strong market is partly determined by the timing of orders.

In 1955, the comeback of cold-rolled sheets was well underway in the early months of the year. It had actually begun in late 1954. Shipments had been running under 700,000 tons a month in the summer of '54. They jumped to over 900,000 tons in November and to more than a million in December.

Plates Drop, Sheets Climb—At the same time, plate shipments were drifting downward. From a high of over 700,000 tons in 1953, they dropped to less than 400,000 tons in most of second half 1954.

Plate orders picked up a little during the first quarter of 1955 but sheet orders jumped more decisively. Sheets made up 20 pct of the product mix in January, or 5 points more than the 1954 average. Plates made up 7.3 pct of the mix, or 1.2 points less than the 1954 average. In this same month, the mills operated at less than 83 pct of capacity. In other words, sheet users were establishing firm positions on the mill books during a slack period while plate users delayed.

Demand Grows Slowly—These



There'd Be Some Changes — If 1955 Product Mix Were Applied

Theoretical 1957 Production (Millions of tons)*		
At Present Product Mix		At 1955 Product Mix
9.5	Plates	7.0
6.5	Structurals	5.0
10.0	Hot-Rolled Sheets	10.7
13.2	Cold-Rolled Sheets	16.0

*At First Quarter Production Rate

U. S. Steel Photo

figures bear out the thinking of one steel production planner. He says that a buildup in steel demand takes place fairly slowly. In 1954 and 1955, it took four months for the pinch to develop. Sheet shipments went over 1 million tons for the first time in a month when the mills operated at 78 pct of capacity. There was advance warning for those who were alert to signs and could guess right and act quickly.

In the current situation, there isn't much that could be done to guard against reduced production of heavy plates and structurals. Lighter plates are different.

Hot-Rolled Juggling — "When I see the pinch coming, I'll load up on light plate," says one purchasing man. He reasons this way: If he is loaded with light stock when the strip mills go back to rolling strip, he can take his full plate allotment in the heavier gages.

Another area of interest is the product range around the fringes of mill limitations. According to past statistics, hot-rolled sheet tonnage would only go up about 700,000 tons in a tight market. There would, however, be important juggling of sizes.

Less Profits — At present the mills are accepting hot-rolled orders outside the desired ranges of about 36 in. to 56 in. width and 10 to 14 gage. They don't like thin gage work; it involves slow, careful handling and a good chance of scrap loss. They don't like heavy gage work because it is less profitable, particularly when you get up to plate sizes.

These fringe area products are available now. In a strong market, the mills will get into selective selling and it will become difficult to get products outside the desired range. Under the same conditions, some mills will go out of the hot-rolled business entirely.

Bar Also Suffers—The statistics indicate bar production will go up in a tight market but probably not enough to satisfy demand fully. In the present market, a user may find it economical to use bars instead of tube rounds, but any long range pricing would have to allow for a return to the rounds. Heavy size bars figure to become scarce.

One big point to consider is the question of supplier stability. This is a touchy point but it is a fact that some mills are quicker to shed hot-rolled business than others. While the buyer can pick his spots now, he should remember that positions could be reversed very quickly. One sheet mill attributes current capacity operations to the fact that it has protected hot-rolled customers in time of shortage.

Markets React Fast — In the whole subject of product mix, the thing to remember is that mill capacity is increasing all the time. Sheet shipments could jump from 15 million tons in 1955 for instance to 16.6 million in 1958 without any change in operating rates or product mix. In the same way, plates and structurals may get a lower percentage share of available steel but have no tonnage drop.

What seems to happen is that consumer markets react faster to an economic upswing. Appliance and auto companies will come into the market, grabbing heavy tonnages of cold-rolled sheet. Industrial markets take more time to perk up.

Air Force Plans Plane Cutbacks

Builders and Suppliers Will Be Hit

New Air Force weapons concept places less reliance on manned aircraft, more on A-bomb and missiles.

Cutbacks will hit aircraft industry and its sub-contractors within the next year.

■ Nuclear weapons and guided missiles are revolutionizing offensive-defensive concepts of the U. S. Air Force. Aircraft companies and their suppliers will feel the impact of this new thinking in the near future.

The tip-off comes from Maj. Gen. David H. Baker, director of procurement and production, Air Materiel Command, Wright-Patterson Air Force Base, Ohio.

Gen. Baker explains that the destructive power of nuclear weapons "has sharply reduced the numerical requirements for strategic air weapons" as compared to World War II. He adds that development of guided missiles has been such that "it is now possible to consider . . . the dates and impacts of their initial operational capabilities."

What's Behind It?—In a speech before the Society of Business Magazine Editors in Washington last week, Gen. Baker made these points:

1. Air Force requirements for manned combat aircraft will drop sharply within the next year. And there will be fewer re-tooling opportunities. Because of high cost due to increasing complexity, "we must have major advances in performance to justify replacement of inventory aircraft. We will not be able to consider new systems that do not add significantly to our striking or defensive power."

2. Because of this, fewer prime contractors will be needed, and airframe sub-contractors "will find a steadily narrowing span of opportunity for their product and services."

3. Airframes and missile frames production, now at 5 million pounds per month, will hit a temporary peak of about 6.5 million pounds per month early next year. But by 1959-60, output will be down to 2.5 million pounds per month and will continue so through 1962.

4. As a result, idle manufacturing capacity of Air Force suppliers will increase from the current 20 million square feet to 50 million square feet. Total capacity is now 60 million square feet. Another 10 million square feet will be added by 1960 but this will be located in remote areas for the testing and firing of missiles and "unconventional" power plants (ramjet engines, rocket motors, and nuclear power).

5. It's not at all certain that missiles will be manufactured in plants now producing aircraft. The Air Force may decide it's cheaper to build new integrated facilities. "These decisions will be made largely on the basis of cost."

For and Against—"It would appear completely logical," says Gen. Baker, "to plan for their (missiles) manufacture in existing plants; yet this raises several problems.

"There will be costs for re-equipping and re-tooling, setting up of extensive testing equipment, transportation to test sites, extended liaison with tear-down opera-

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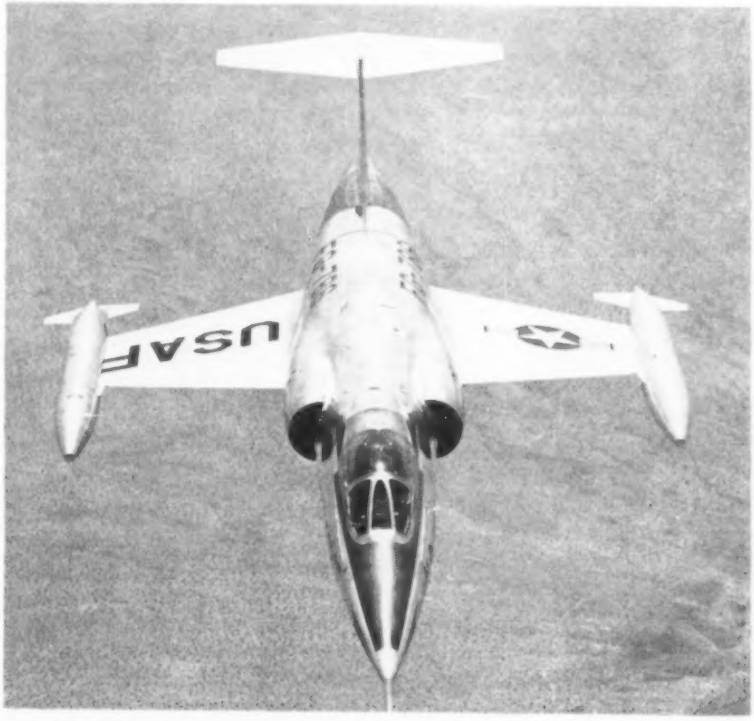
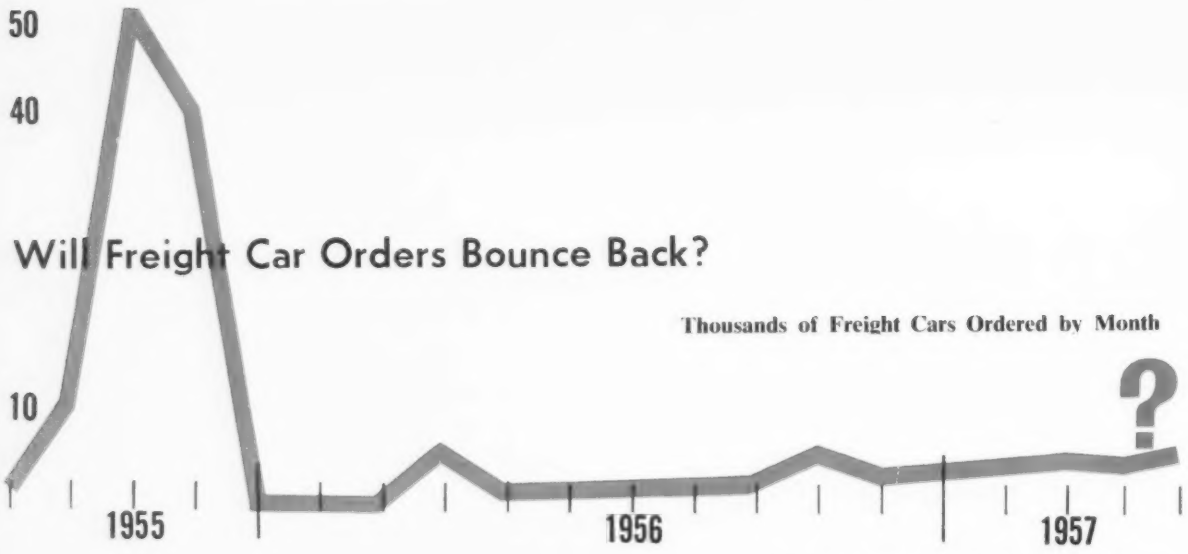


UTRASONIC: Under new Air Force weapons concept, fewer planes like this ultra-sonicF-104A Star Fighter will be needed to fight America's battles. This will greatly affect military aircraft producer operations.



Source: American Railway Car Institute

Railroads Study New Car Program

Railroads need the cars, but financing is the problem.

Eastern roads are reported working on their own joint program. Large orders would tighten steel market.—By R. D. Raddant.

▪ A new, major freight car program may be building up in the three big eastern railroads. Only the problem of financing stands in the way of orders for thousands of additional cars.

If the program does materialize, it will come on top of a backlog of more than 100,000 cars on order and a steady rate of new orders that has stood up surprisingly well after the big program placed in late 1955.

Steel Market Effect—If a substantial number of new orders are placed, it would have a severely tightening effect on the steel market for light plates and structurals and other products used in freight car construction. It could prevent the easing of the market for these products for months to come.

But the financial problem is not easily solved, if it can be at all. Since the end of fast tax write-offs for freight cars, the railroads have been reluctant or unable to carry the 5 to 6 pct interest required to finance the conventional equipment trust.

Joint Program—The three major eastern railroads, New York Central, Pennsylvania, and Baltimore & Ohio, are reportedly discussing a plan for a joint program.

While none of the railroads involved will comment, it is believed to take the form of a railway equipment agency or freight car corporation that would buy the cars, then lease them to the roads on a long term basis.

Need Federal Help — Government assistance would be asked in the financing, although what form is not clear. One theory is the corporation might ask government guarantees of the equipment notes to obtain lower interest rates. Another is that the government would be asked to finance the equipment corporation.

The Association of American Railroads also has under study a program submitted by Robert Heller & Associates, a Cleveland management firm. This report is believed to state the needs of the railroads at a total of 500,000 new freight cars at the rate of about 100,000 per year.

The need of the railroads for additional freight cars is generally accepted, although the push for a new program is concentrated in the three major eastern lines.

Scrap Rate High—A large percentage of present rolling stock is over 30 years old and rate of dismantling and scrappage in many cases approaches the rate of new cars delivered.

Take the New York Central, for example. The road originally placed orders for 17,000 cars late in 1955, is now receiving about 1000 per month. In 1956 it scrapped 7000 cars against about 8000 delivered. It is now adding to its rolling stock to some extent. The New York Central has a total of 117,744 cars, plus 26,171 owned by its subsidiary, the Pittsburgh and Lake Erie.

The Pennsylvania says its fleet is

gradually growing. During 1957, the Pennsy is building a total of 1790 cars, will authorize 1040 for dismantling. Replacement will be on a limited basis for 1958.

Plans for 1958—The Pennsy's plans for 1958 are indicative of the situation. Present plans and financial arrangements call for 1500 gondola cars, 100 covered hopper cars.

"The limiting factor on new cars is money," a spokesman says. "More would be ordered if funds were available."

An official on the Baltimore & Ohio says the company has an "anticipated program for 1958," but says financing problems stand in its way.

The New York Central also admits that financing blocks scheduling larger programs. One official points out that the best possible interest rate for an equipment trust is between five and six pct, while the company's return on investment was about two pct, to illustrate the difficulty of financing new equipment.

Backlog Stays High — As the freight car picture stands now, the backlog of cars on order and undelivered May 1 was 105,190, compared with 107,708 a month previous, and 137,436 May 1, 1956.

Deliveries of new cars totaled 8,961 in April while new orders for the month reached 6,429, up somewhat from the average in recent months.

In addition to the orders for new cars, the railroads have been rebuilding at a rapid rate. This year the B & O, for example, will rebuild 2000 hopper cars, 725 gondolas (70-ton), and 1000 box cars in its own shops.

Present push for a big program, however, is centered on the three giants of the East. Many other railroads in other sections of the country don't see the need to launch a big program.

For this reason, many railroad authorities do not expect the board of directors of the AAR to recommend a general program.

Guide For Handling Welfare Plans

New study shows labor and management how to improve health and welfare programs, cut their cost, and avoid waste.

Specific tips are offered on dealing with insurers.

▪ If handling employee health and welfare plans has you baffled, help is on the way in a new study just issued by the Foundation on Employee Health, Medical Care and Welfare.

The study, "Problems and Solutions of Health and Welfare Programs," is a guide showing both management and labor how to improve their rapidly growing health and welfare funds, cut costs, and avoid waste.

Handle With Care—The Foundation, which is jointly sponsored by the International Assn. of Machinists AFL-CIO and U. S. Industries, calls attention to the millions of dollars which have gone down the drain through careless placement of insurance contracts or insufficient attention to coverage specifications.

They point out, "Much attention has been given in the last few years to the highly publicized instances of corruption in the administration of a handful of health and welfare funds. What concerns us in this study is that no comparable attention has been given to the losses of money and the gaps in insurance protection that stem from lack of technical knowledge on the part of labor and management representatives."

Specific examples are cited of how substantial sums of money have been saved in health and welfare plans where company and union officials were fully informed.

Ask The Experts — Once labor and management have agreed on price and kinds of benefits, they are then "united in a single common objective—how to obtain the best benefits at the lowest cost."

But they are not insurance experts. Rather, they are "amateurs in a world of technicians," the report observes. As joint buyers they must deal with insurance companies, doctors, hospitals, actuaries, banks, and others. All of these groups are made up of skilled sellers who know the complexities of a field.

Points To Remember—Purchasers of health and welfare insurance are urged to:

Get competitive bids from insurance companies. Costs and services vary.

Cover as large a group as possible. Rates go down as the number covered goes up.

Hold commission payments to a minimum. Try having all policies combined for commission purposes. Don't pay brokers or agents commissions for services the insurance company should do for free.

Consider "self-accounting." It is usually cheaper to do your own premium statements and other paperwork than to let the insurance company prepare them.

Think twice before changing insurance carriers, even if you are not happy with the one you have now. A change often means extra costs.

For perplexed buyers, the new study gives basic data on what health and welfare benefits are available, who sells them, how to evaluate them, and how to decide where to buy. Addressed primarily to jointly administrated funds, the study should prove equally useful to all employer or union buyers of health and welfare benefits, according to Theodore W. Kheel, Executive Director of the Foundation.

Profit Sharing Pays its Way

Report 2000 New Plans Started in 1956

There's no unanimity, but advocates of profit sharing are gaining ground.

Both Internal Revenue and Council of Profit Sharing Industries report 1956 was banner year.

Survey indicates workers who share in profits have better attitudes.

▪ Businessmen are still taking sides over profit sharing. Some praise it. Others want no part of it. But the advocates are gaining on the critics. Profit sharing is showing an accelerated, though still cautious, growth.

Figures released by the Internal Revenue Bureau (first since 1946) and statistics from the Council of Profit Sharing Industries indicate more companies are considering profit sharing as a means of getting closer cooperation between management and workers.

2000 in 1956—Internal Revenue Bureau reports more than 2000 new profit sharing plans were started in 1956. Total is now more than 10,000. Some 13 pct of office workers and 7 pct of hourly wage earners participate in profit sharing, according to a study of 5.5 million workers in 17 major labor areas. Of all profit sharing and pension plans approved by Internal Revenue, 94 pct are still in effect.

The Council of Profit Sharing Industries says many plans included in government figures fail to cover substantially all employees. The Council's definition requires full coverage. About 1500 to 2000 plans now meet this standard.

Take It Easy—About half the Council's members are firms just studying profit sharing. The Council usually advises a go-slow approach to insure a plan properly adapted to company needs, and to give employees a chance to understand its purposes and significance.

Deferred payment plans outnumber cash benefit plans, especially in larger companies. Profit sharing pension plans offer tax and other advantages over actuarial plans.

Here are some examples of profit sharing plans:

Some Which Have—For 1956, Signode Steel Strapping Co., Chicago, contributed $781,000 to its profit sharing fund (covering 929 employees), on the basis of a $45,717,000 gross business, $4,044,000 net.

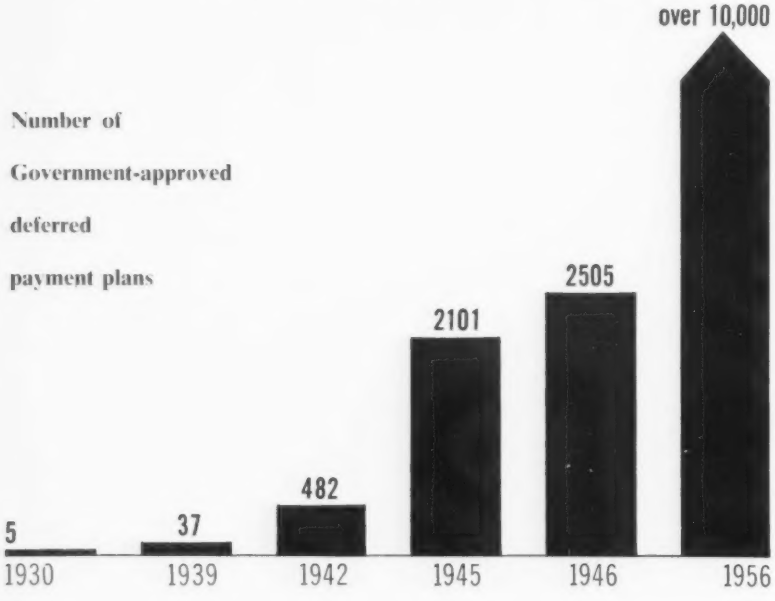
Arwood Precision Casting Corp., N. Y., has a combined cash and deferred plan. Its 1956 cash benefits to employees were equivalent to 41 extra days pay for all 650 employees. Workers get 50 pct of net profit before taxes, after 5½ pct return has been set aside for stockholders.

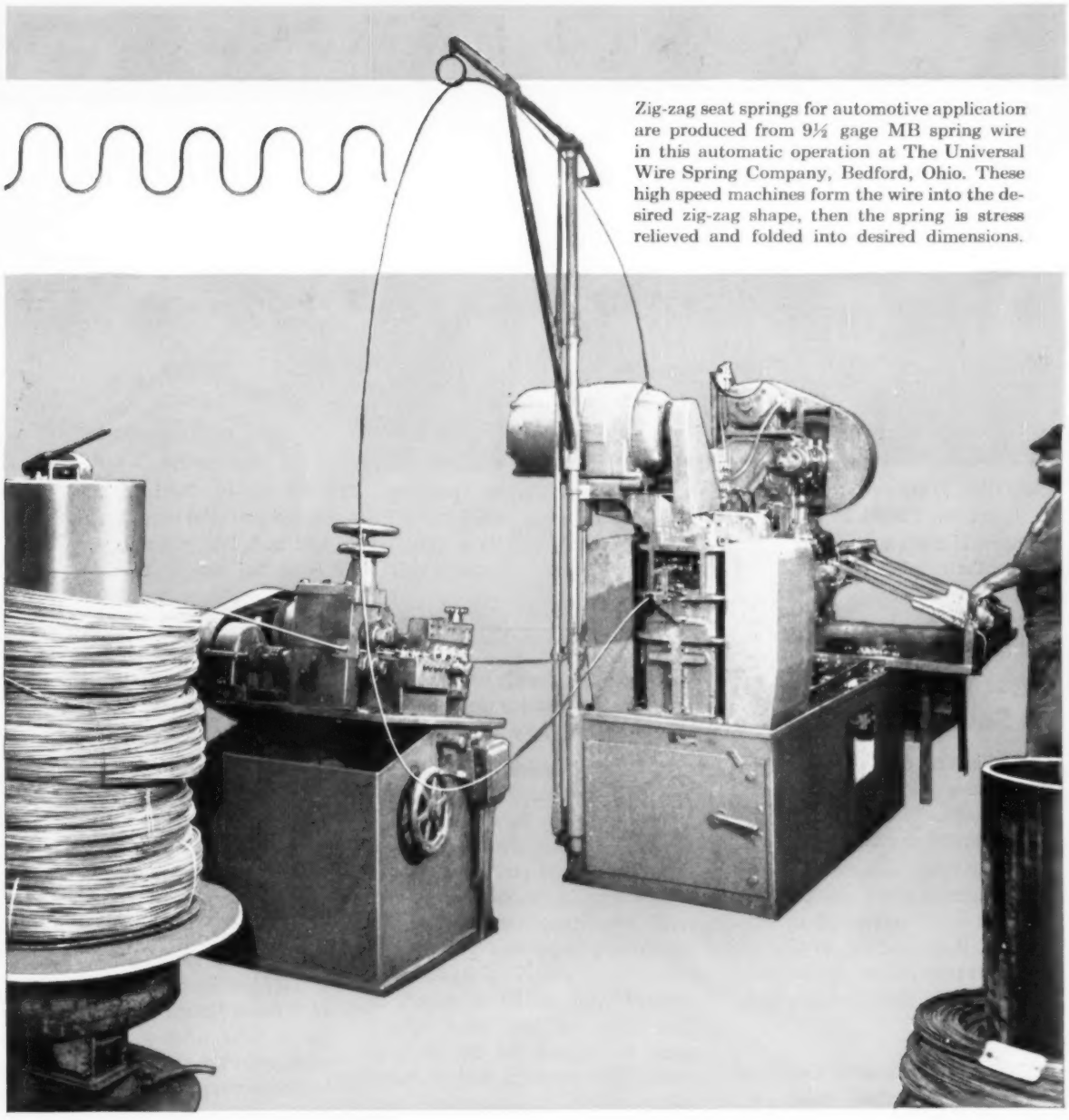
Vanadium-Alloys Steel Co., Latrobe, Pa., has a cash plan with provision for part of the profit to be put in trust for employees.

Workers in Favor — The factor that enables a company to share its profits, yet have as much or more left for stockholders, is worker attitude. In a recent study, Public Opinion Index for Industry, a division of the Opinion Research Corp., Princeton, N. J., found a better attitude in workers who share profits than those who do not.

The idea that profit sharing is a device to forestall unionization is fading. About 35 of the Council management members have unions in their plants.

Progress in Profit Sharing Plans





Zig-zag seat springs for automotive application are produced from 9½ gage MB spring wire in this automatic operation at The Universal Wire Spring Company, Bedford, Ohio. These high speed machines form the wire into the desired zig-zag shape, then the spring is stress relieved and folded into desired dimensions.

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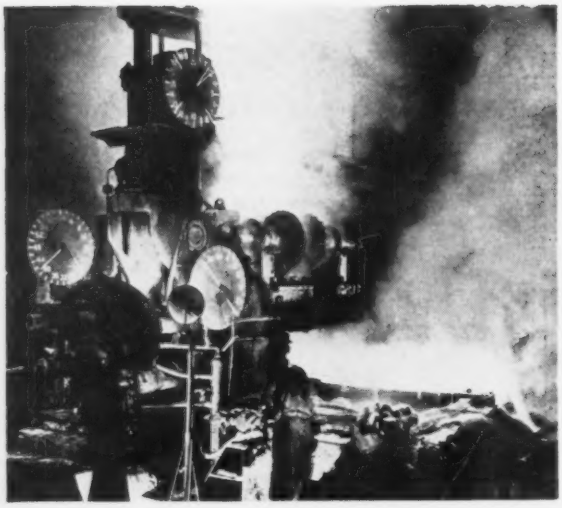
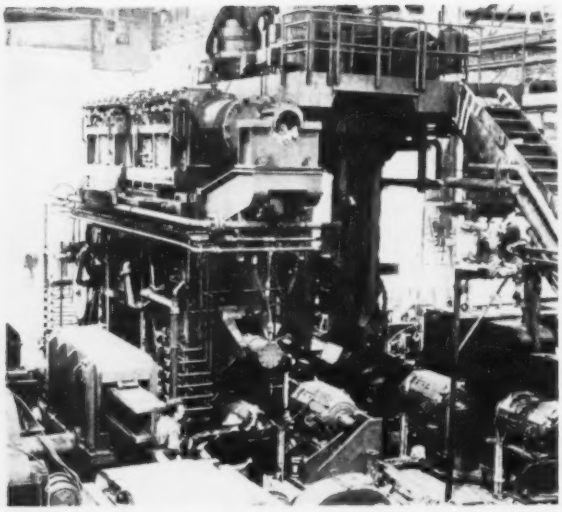




RECORD TIME: It took only 12 days of downtime for Dominion Foundries and Steel, Ltd., to replace a 38-year-old plate mill. The H. K. Ferguson Co. took six months to plan the job to minimize the time out of operation. The new 46-in. 2-Hi Universal-Type slabbing mill has doubled potential output of the Hamilton, Ont., plant. Old mill, left, gives way to modern facility, right, as it is pushed into position.

Fight Is On To Save Tax-Am

Mobilization officials are fighting hard to save at least basic tax amortization authority from a free-swinging congressional axe.

Gordon Gray, director of the Office of Defense Mobilization, is urging that a bill sponsored by Sen. Harry F. Byrd, D., Va., to virtually kill tax amortization, be amended to retain basic, flexible tax amortization authority.

Suggested Goals—The Gray proposals would permit future tax amortization goals to cover facilities for military and Atomic Energy Commission research and development; for production and transportation of direct Defense and AEC items and components and for facilities to produce special and strategic minerals, metals or gases for direct military or AEC procurement.

Mobilizer Gray also is opposing language in the Byrd Bill which would limit amortization to "new defense items." Mr. Gray is concerned that the term "new" might block important expansion of facilities which are already producing defense items but which would have to be expanded in an emergency.

Power to President—Most important and most controversial of the ODM proposals is that any new legislation on tax amortization give the President the power, after notifying Congress, to suspend temporarily restrictions on tax am, and restore any expansion goal he believes necessary. This standby authority could not be delegated, so that ODM or any other agency could not reopen the tax am program. This proposal will probably fail.

The proposed amendments to the Byrd Bill would not permit tax amortization for steel, electric power, or any other expansion of the general productive capacity of the country, Mr. Gray says.

Correction

In reporting McLouth Steel Corp.'s first quarter '57 net income versus their first quarter '56 net income (THE IRON AGE, May 9, '57, p. 75), the pct change was inadvertently given as minus 40.3 pct. It should have been plus 40.3.

Welding Wire Fabric

Cleveland's first welded wire fabric machine has begun operating at Cuyahoga Works, American Steel and Wire Div., U. S. Steel Corp. A second machine is scheduled to be in production soon.

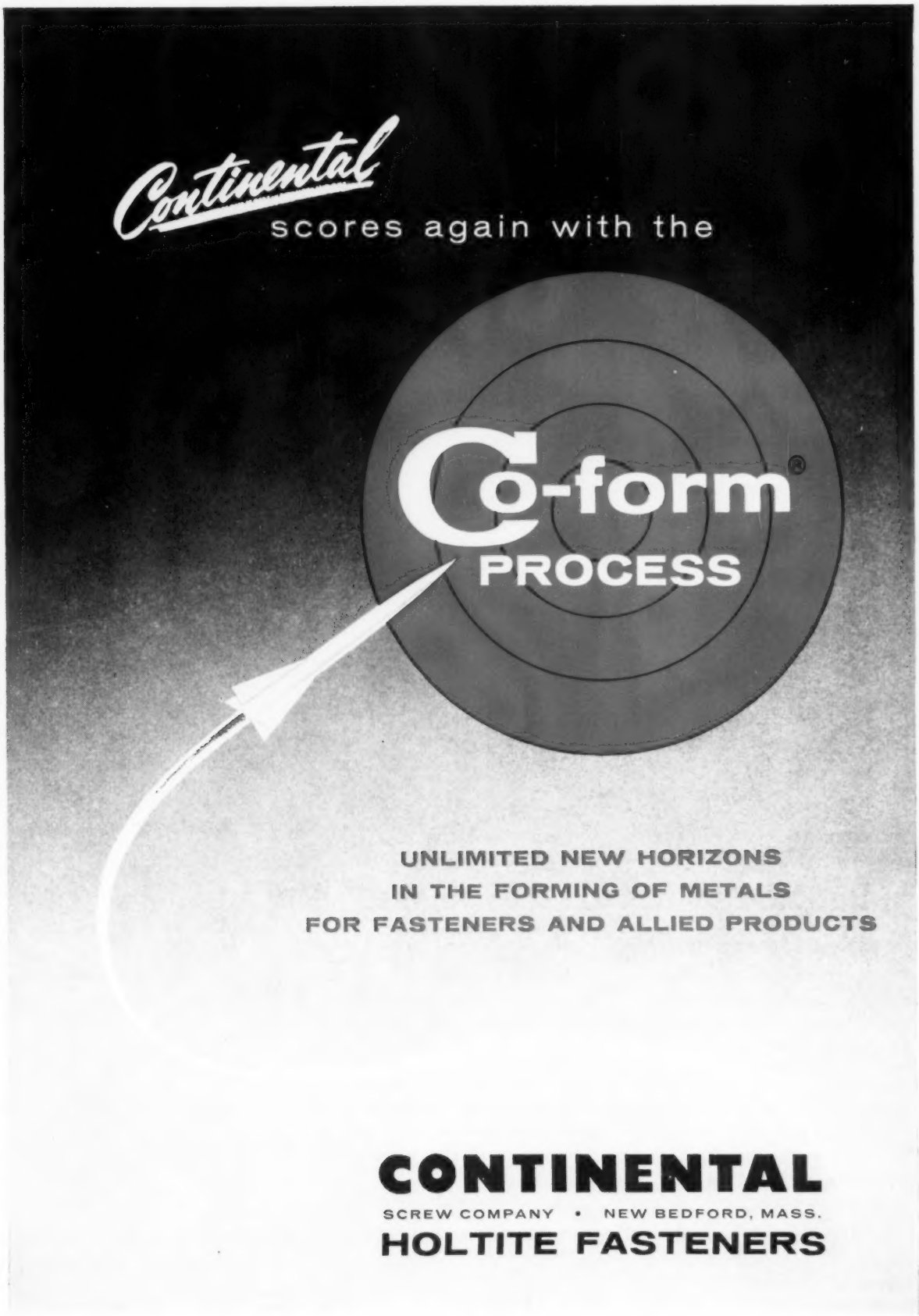
Each unit can produce 1700 tons of welded wire fabric a month. The machines, nicknamed "industrial spiders," are more than 10 ft high and 132 ft long. Mounted to their rear are 49 reels containing from two to four miles of wire. As the wires enter the machine, mechanical fingers position them.

Helicopter Study

Convertawings, Inc., Amityville, N. Y. has been awarded an $89,000 contract by the Army for research on the four-rotor helicopter concept.

Commonly called a quadrotor, the arrangement consists of four small rotors replacing the one or two larger rotors normally powering a machine.

The contract will provide for studies covering reduction of both initial cost and maintenance cost.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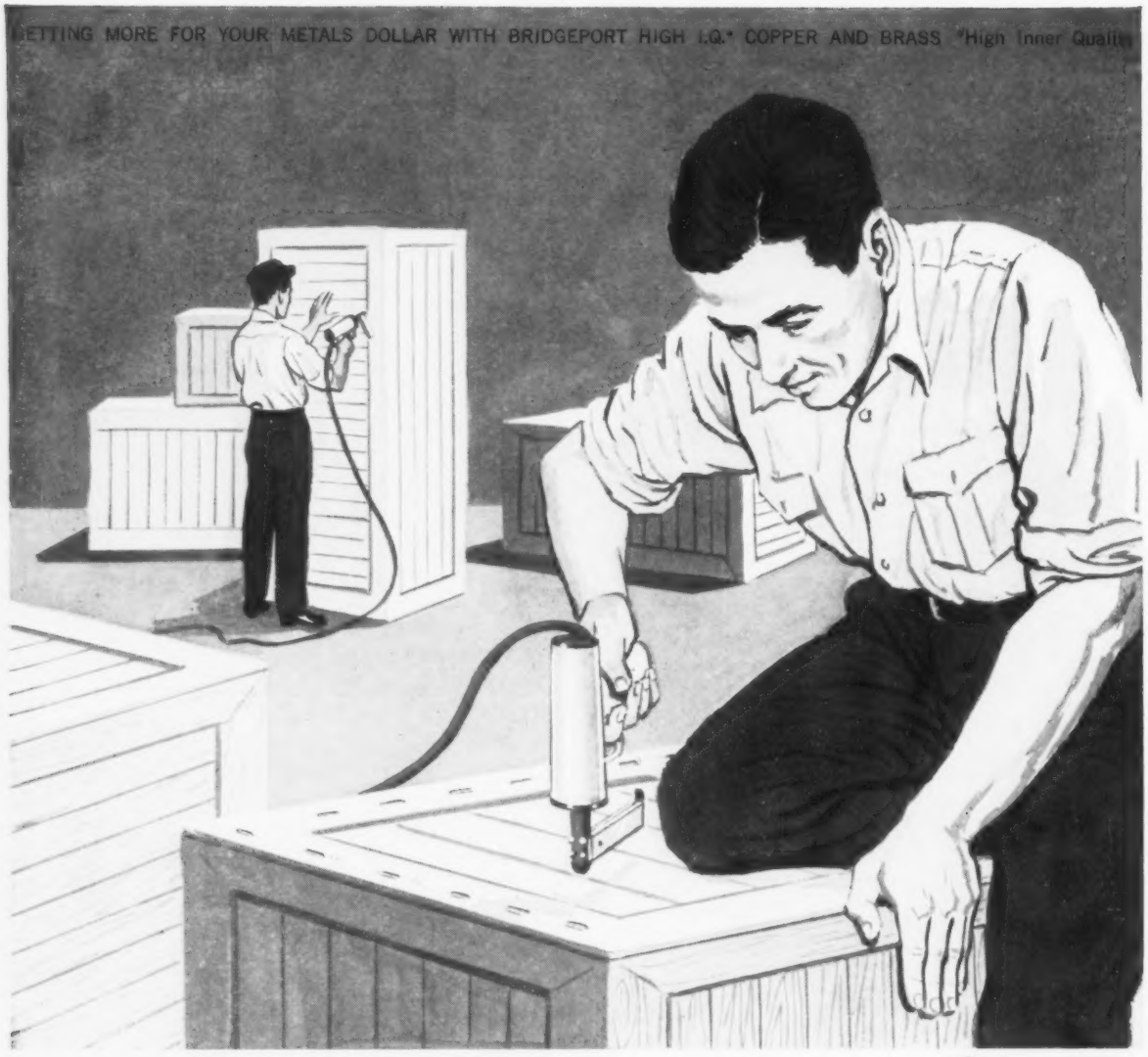


BRIDGEPORT BRONZE AND BRASS:

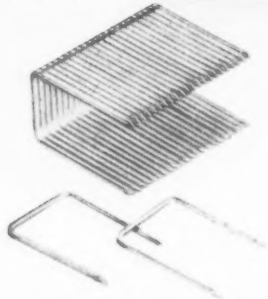
Best "Ammunition" For Stapling Gun

California Wire Products Company, Inc., Visalia, California, manufactures air-operated staplers for a variety of crating and assembly applications; wood-to-wood, sheet metal to wood, roofing, wall paneling, etc. Often, many of these applications are subject to fresh and salt water corrosive attack.

Solving both corrosion problems required two Bridgeport alloys with suitable anti-corrosive properties and workability. Calwire's staple-cutting and forming machines are specially designed, and "alloy adaptability" to their production methods is a prime factor.

Bridgeport Yellow Brass Wire #16 with a tensile strength of 65,000 to 80,000 psi in diameters of .0625" and .080" is used for staples that must withstand fresh-water corrosion. Bridgeport Duronze #609 (Silicon Bronze) Wire with a psi of 80,000 to 100,000 and diameters of .0625" and .080" is used when salt-water corrosion is present.

This is another example of how Bridgeport meets specific problems—unique and common—with one or more of its long list of *standard* alloys. Call your nearest Bridgeport Sales Office today—there's one near you.



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Gustav von Reis

What Small Business Must Have

This well-traveled machine tool company executive runs a model plant in Michigan.

Compared to other countries, the state of small business in the U. S. is healthy, he says.

But he contends there are two fundamental ills besetting small businessmen today.

Gustav von Reis (right): Slow write-offs are draining profits.

▪ Continued prosperity in the U. S. depends on the competitive position of small business, says Gustav von Reis, president of Detroit Broach & Machine Co. and one of the nation's outstanding broach engineers.

"What is necessary to keep us far ahead of other countries is for small business and medium-sized business to be able to operate under conditions which will enable them to realize fair profits," he states.

Reason to Worry — Mr. von Reis, who came to America from Sweden in 1926 with $45 in his pocket, considers his own experience an irrefutable example of the fruits of free enterprise.

"My concern now is that, over the past 12 years here in America, the opportunities for profit for the small businessman have been drastically reduced. If this continues," he contends, "these men will eventually lose their interest in pushing forward and our standard of living will go down."

Making a Name—As a former student at Sweden's Chalmers Institute of Technology, he arrived here, a youth of 23, with a lot of potential and little else. After a $3 a week stopgap job in Brooklyn, he landed a position with Colonial Broach Co. in Detroit, then went to Ex-Cell-O Corp. During this time, he was credited with developing surface broaching.

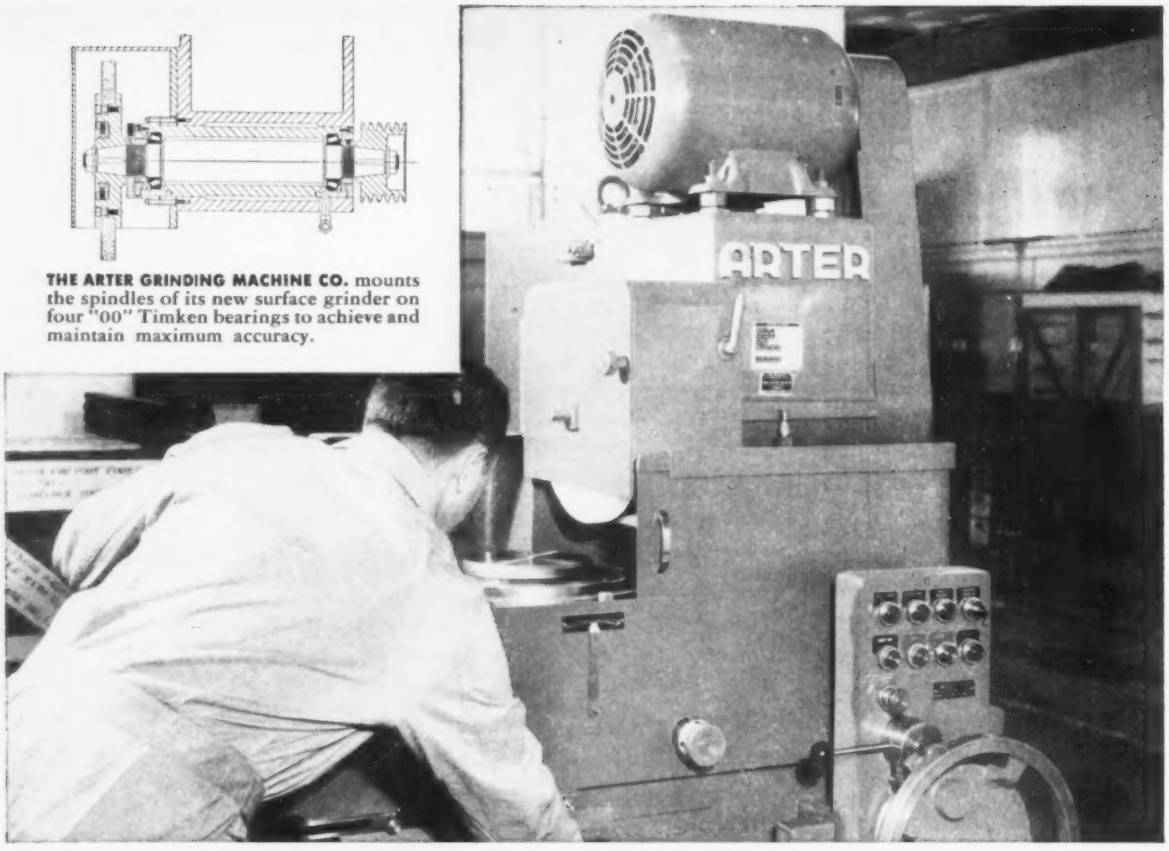
In 1934, with several partners, he established the Detroit Broach Co., struggled along for years until the tiny firm made a name for itself. The company's present plant in Rochester, Mich. is one of the showplaces of that area.

Diagnosis—"I travel to Europe several times a year on business, was born and raised there, and believe I am able to judge fairly well what has made this country great and European countries not able to progress as we have," Mr. von Reis explains.

At the root of the "drastically reduced" opportunities that Mr. von Reis sees as the deterrent to progress are two evils: the wage spiral and unrealistic tax write-off rates for new equipment. He feels that a too rapid increase in wage and salary rates without corresponding technical gains is draining small business' capital.

"There is a tremendous future in technical improvement," he claims, "but unless industry has a breathing spell and is permitted a fair amount of profit, it cannot afford to buy improved equipment."

THE ARTER GRINDING MACHINE CO. mounts the spindles of its new surface grinder on four "00" Timken bearings to achieve and maintain maximum accuracy.



New precision grinder costs less to make, gives smoother spindle operation with TIMKEN® bearings

TO get the smooth spindle operation required for the extreme precision of their new surface grinder, The Arter Grinding Machine Company mounted the work spindle and the wheel spindle on four "00" Timken® tapered roller bearings. The extremely low run-out tolerances of Timken "00" bearings—75 millionths of an inch—make possible the closest machining tolerances ever achieved. And by using two Timken precision bearings on the spindle, Arter got greater capacity in less space—cut manufacturing costs ⅓ over earlier spindles used.

Timken "00" precision bearings not only deliver highest precision, but like all Timken bearings, they take both radial and thrust loads in any combination. And full line contact between Timken bearing rollers and races gives them extra load-carrying capacity. Shafts are held rigid — accuracy is maintained — gear life increased. Timken bearings run smoothly because they practically eliminate friction. They're designed by geometric law to have true rolling motion and precision manufactured to live up to their design. Normally last the life of a machine they're in.

The Timken Company developed "00" bearings to meet the demands of today's new precision machine tools. To produce these bearings, the Timken Company perfected measuring devices of unprecedented precision and developed new manufacturing techniques. The "00" bearing has achieved twice the precision of any previous Timken bearing.

Whatever machines you buy or build make sure your bearings are the best. Look for the trade-mark "Timken" on every bearing and be sure of maximum life, dependability, and minimum maintenance. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

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This symbol on a product means its bearings are the best.

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TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS ROLL THE LOAD

A Few Business Bumps Don't Hurt

Not every element in the economy will hit a record this year. Many won't come close.

But you won't miss some of the false values that were lost in the shakedown. In many ways, the economy was never better.

▪ You can just about wrap up 1957 and put it away. That is, as far as figuring out what kind of a business year it is. It will be one of the best; but not the best. In some areas of business, it won't be even second best.

But that doesn't make it a bad year. In some ways, it should be encouraging. In a shakedown period, it's always a dangerous possibility that a few downtrends here and there will send business running for cover. That is highly unlikely at this time.

Few Bubbles to Burst—There's another good point. There are relatively few artificial factors at work to create the bubbles that burst with serious effects later on. There is no runaway credit. Purchases made today are made with hard cash—or under terms that would eliminate any false interpretations being drawn from them.

And yet business conditions are surprisingly good. There is little pessimism at the executive level except in areas that are suffering from long term ills that require more than a good economic climate for a cure.

Graphs Still Point Up—If you study the charts of the accepted economic indicators, you will be surprised how many are still on the upgrade; how few show downtrends. Significantly, income, gross national product, corporate profits, employment, new construction, and many others, all continue on the rise.

A cautioning word: Inflation is still a worry. About half of the rise in gross national product in the past year is directly attributable to higher prices, not to any increase in production. There will be another round of wage increases, then price increases, this summer. Keeping prices under control is still a top problem.

But Home Building Drop Does

Slowest Since 1949—One thing that does hurt is the decline in home building. April was the slowest for the month since 1949. It's true that business, industrial and government building continues at a record clip keeping total construction at top levels.

But home building generates more than a market for building materials. Many consumers durables depend on new homes for that extra zest in their market.

It's a tribute to the salesmanship of the appliance industry that its sales are holding up so well in the face of the decline in home building. Nevertheless, the new home building drop is a serious thing to more than the construction industry.

Blame the Birth Rate—There is a creeping belief that there is more wrong with the home building rate than tight money. After all, there has been little hue and cry for easier mortgage money from the general public. Most of the noise has come from the builders.

This is another area where the birth rate followers come into their own. The theory is that the low birth rate of the 30's has resulted in a small group in the first home category. You can take that theory with some skepticism. After all, that rule would have applied in 1955 just as well.

Old Age: New Economic Factor

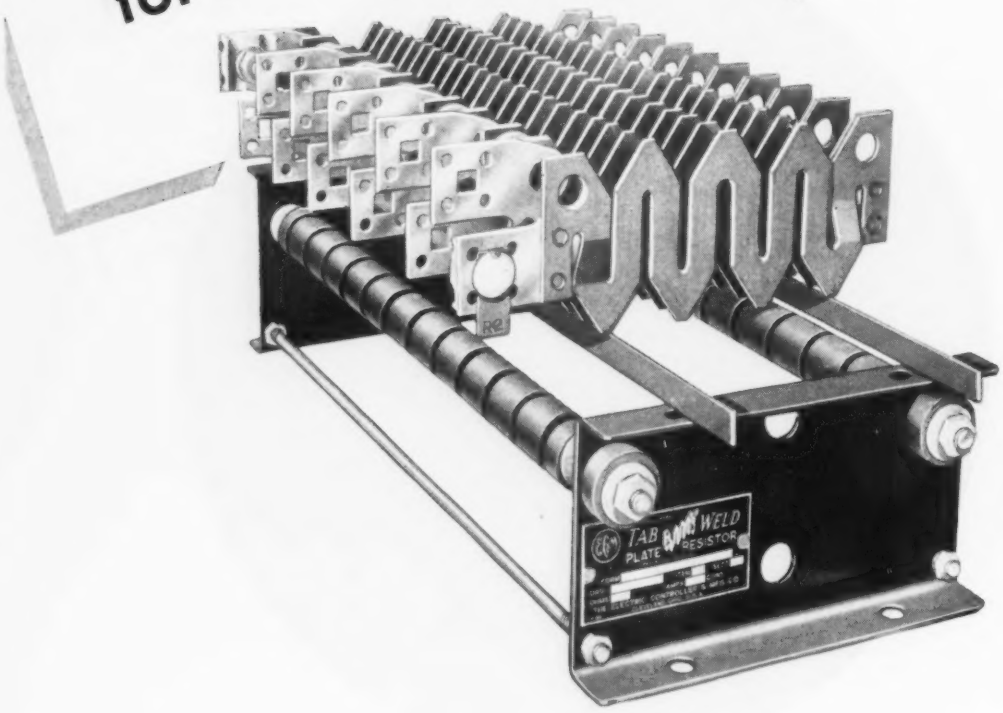
Surprising Source — It's not particularly surprising that personal income hit a new record in April, cheerful news that it is. With business booming along and wages well up over a year ago, it might have been expected.

But it is somewhat of a surprise to realize that nearly half of the increase in April came directly from higher old age benefits, a direction that is not generally looked for as a factor in the accepted economic indicators.

More Social Security—It's pointed out that farm operators and some other groups are now becoming eligible in large numbers to receive Social Security payments. Also, the 1956 law which made women eligible for old age payments at 62 instead of 65 is having a significant effect.

Up to Expectations — For the record, the seasonally adjusted rate of annual income for April was $339.3 billion. This compares with $331.5 a year ago.

EC&M Tab-Weld® Resistors are BOLTED and WELDED for Constant Current Path!



Unlike other resistors, EC&M Tab-Weld Resistors do *not* require periodic tightening of clamping nuts to compensate for loss of pressure caused by alternate heating and cooling. Grids are offset and mating ends are spot welded. Tap-plates are also welded into place at close intervals along the grid assembly...This EC&M construction offers 4 big advantages on heavy duty motor applications: *(1)* stabilized ohmic value *(2)* no burning at grid-eyes or at tap-plates *(3)* easy tap-shifting for best motor performance and *(4)* long life without maintenance!

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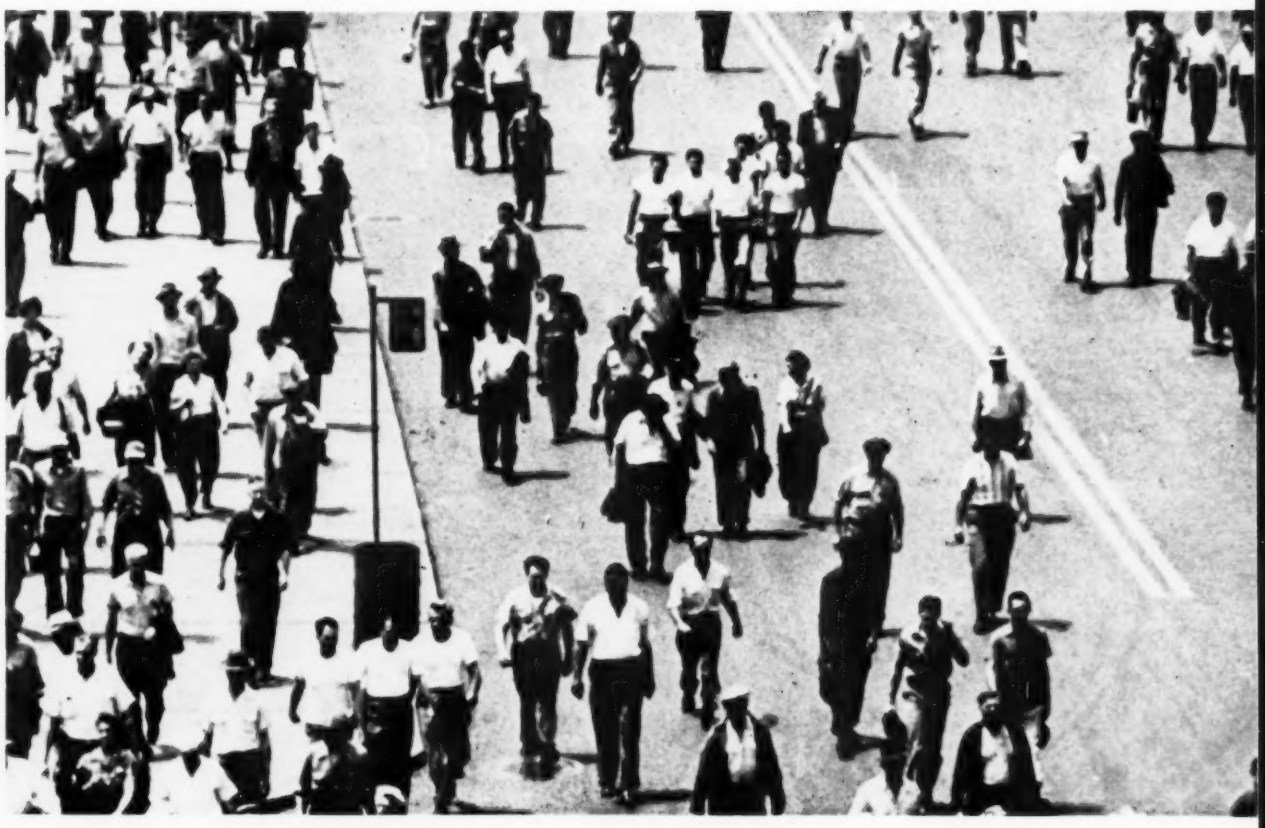


How To Build Good Labor Relations

IN THIS FEATURE

To learn what management is thinking—and doing—about its labor relations, THE IRON AGE went to some 2000-odd executives in the metalworking field.

The answers add up to a practical handbook on how to build good management-labor relations. They reflect the sound foundation of the day-to-day give-and-take between management and workers.

Management has learned that it pays to keep workers and supervisors informed. It ranks good communications No. 1 in its thinking on what's best to keep peace in the industrial family.

Even more important, management rates employee relations on a par with production, sales, and other functions necessary to the success of a business.

Metalworking Executives Rate High in Labor Relations Survey

Replies to questionnaire show that metalworking management is doing a good job.

Its day-to-day relations with workers and union leaders are on solid ground.

Management's attitude reflects importance of employer-employee relationship.

▪ R. L. Gray, president of Armco Steel Corp., said recently that the biggest job facing industrial management today is the conduct of employee relations.

Metalworking management not only agrees; it is practicing what it preaches.

What Management Thinks—To learn what management is thinking and doing about its labor relations, THE IRON AGE posed a series of questions to some 2000-odd metalworking executives.

On the basis of their replies, management people place good labor relations on a par with production, sales, and other important functions in the operation of a business.

What Management Does — The great majority of companies responding to the survey are doing the things that industrial relations experts say are necessary to build good labor relations. Few indicated any deep-seated resentment toward labor as such, although some criticism was directed against the tactics of labor leaders.

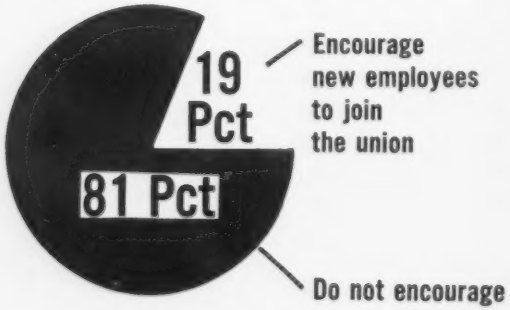
Apparently, the day-to-day relations between the workers and their bosses are good. At the same time, no one pretends that the milennium has arrived. Nor is there any effort to give the impression that all is sweetness and light.

Union Progress—The survey also revealed the great strides made by unions since passage of the Wagner Act in 1935. Of those responding to the survey, some 89 pct are operating under union contracts. These companies represent a cross-section of small, medium, and big business.

Also significant is the trend toward contracts requiring union membership as a condition of employment. Nearly 58 pct of the companies have union shop or closed shop contracts in one form or another. Less than 10 pct are unorganized. The balance operates under non-compulsory agreements.

Regional Gains — Apparently labor has scored its best gains in compulsory unionism in the Middle Atlantic, East North Central, West North Central, Pacific Coast, South Atlantic, and New England areas. They have been least successful in

If you have a non-compulsory contract, do you encourage new employees to join the union?



Regional breakdown

Region	Yes	No
New England	8.3 Pct	91.7 Pct
Middle Atlantic	17.4	82.6
South Atlantic		100.0
East North Central	22.0	78.0
East South Central	12.5	87.5
West North Central	60.0	40.0
West South Central	25.0	75.0
Mountain		100.0
Pacific Coast	14.3	85.7

Do you give your frontline supervisors authority to settle Step 1 grievances?	
Yes	95.3 Pct
No	2.7 Pct
Occasionally	2 Pct

Do you instruct your supervisors in contract details?	
Do instruct	96.0 Pct
Do not instruct	2.0 Pct
To some extent	2.0 Pct

Have you an agreement with the union on a time limit for settlement of grievances?	
Have an agreement	80.8 Pct
Do not have an agreement	14.1 Pct
Depends on type of grievance	5.1 Pct

Do you have a definite program aimed at keeping employees informed about the company?	
Do have definite program	70.0 Pct
Do not have definite program	25.2 Pct
Informal program only	4.8 Pct

Do you correct worker grievances promptly?	
Correct grievances promptly	94.8 Pct
Do not correct promptly	0.7 Pct
Depends on grievance	4.5 Pct

Do you encourage supervisors to get along with shop stewards?	
Do encourage	97.3 Pct
Do not encourage	2.7 Pct

the East South Central and West South Central regions.

In some companies, management's desire to foster good labor relations has reached the point where new employees are encouraged to join the union. Some 19 pct of the companies reported they urge new workers to sign up with the union even though membership is not a condition of employment.

Management Cooperation—Employers in the West North Central area are the most cooperative in this regard. Sixty pct of them said they give the union a lift in bringing new workers into the fold. In the West South Central region, 25 pct of the companies encourage union membership, while 22 pct of East North Central employers do the same. South Atlantic and Mountain areas scored zero.

Metalworking management also is doing a job in the processing of worker grievances; in familiarizing supervisors with contract details; in keeping employees informed about the company; in encouraging supervisor-union steward cooperation, and in joining with the union in community affairs.

"Forgotten Men" Remembered—Foremen and other frontline supervisors apparently are no longer the "forgotten men" in the union-management relationship. Top management has often been accused of placing foremen in a no-man's land, of refusing to back up their decisions on labor matters.

The survey indicates this situation has changed—if it ever was the case. Frontline supervisors in over 95 pct of the companies who answered this question now have the authority to settle Step 1 grievances. Another 2 pct do occasionally.

Management On Grievances—Most companies have learned that it pays to settle a grievance promptly—in the first step of the grievance procedure, if possible—before it develops into a cause celebre. Although most contracts now call for arbitration of grievances that get out of control, relatively few reach arbitration.

Some 95 pct of the companies

Do you cooperate with the union in community affairs?

Do cooperate	67.3 Pct
Do not cooperate	22.9 Pct
Do occasionally	9.8 Pct

Breakdown of Respondents by plant size:

500—999	58.0 Pct
1000—2499	29.0 Pct
2500 and over	13.0 Pct

Breakdown of answers based on type of contract:

Have non-compulsory contract	32.4 Pct
Have compulsory contract	57.7 Pct
Have no union	9.9 Pct

Regional breakdown of responses by type of union contract:

Region	Non-compulsory	Compulsory	Non-Union
New England	37.6 Pct	43.6 Pct	18.8 Pct
Middle Atlantic	24.5	65.9	9.6
South Atlantic	50.0	50.0	
East North Central	29.7	63.0	7.3
East South Central	57.1	21.5	21.4
West North Central	45.5	57.5	
West South Central	57.1	28.6	14.3
Mountain	50.0		50.0
Pacific Coast	38.9	50.0	11.1

report they aim for a prompt settlement of grievances. Less than 1 pct admitted to a policy of dragging out the grievance procedure. The balance said the speed of settlement depends on the type of grievance.

More than 80 pct of the companies have an agreement with the union on a time limit for the settlement of grievances.

Bosses Know Contracts—It used to be that union representatives could run rings around company supervisors in knowledge of contract details. But if that's the case today, it's not management's fault. Of the companies responding to the survey, 96 pct instruct supervisors in contract fine points. Another 2 pct say they do so "to some extent."

As you will see later on in this report, management considers good communications the No. 1 factor in promoting amicable relations with labor. In support of this belief, 70 pct of the companies told THE IRON AGE they have a definite program aimed at keeping employees informed about the company. Another 4.8 pct have an informal program.

Why Management Speaks Up—This was not always the case. Says Mr. Gray of Armco:

"Years ago management thought it dangerous to give out information about the business. But that viewpoint has changed greatly in the past 25 years.

"We cannot expect our people to make sound decisions unless they have proper information."

Old Sores Forgotten—The old antagonism between frontline supervision and the union shop steward also is out the window, according to the survey. More than 97 pct of the companies reported they encourage supervisors to meet the shop steward half way.

Joint union - management effort in community affairs is becoming more commonplace. More than 67 pct of the companies say they cooperate with the union in various civic activities and drives.

How Management Rates Essentials To Good Labor Relations: Factor	Non compulsory Contract	Compulsory Contract	Non-union Shops
1. Good Communication	39.2 Pct	28.4 Pct	33.3 Pct
2. Fair but firm	23.8	27.7	
3. Understanding of others' problems	22.6	25.2	22.2
4. Honesty in dealings	16.7	24.5	11.1
5. Mutual Trust and respect	16.7	27.1	22.2
6. Prompt settlement of grievances	8.3	13.6	11.1
7. Adhere to both spirit and word of contract	8.3	16.1	
8. Golden Rule	7.1	3.9	22.2
9. Good Promotion System	6.0	4.5	11.1
10. Mature objective attitude	2.4	5.8	
11. Fair wages	2.4	3.2	
12. Safety	1.2		

Industry Learns To Speak Up

Good communications ranked first among factors necessary to improve labor relations.

"Fair but firm" policy also stressed in comments from industrial management.

More cooperation from union leaders would help a lot, say some management people.

▪ Labor's great organizational drives of the late 1930's confronted industrial management with a new dimension in employee relations. Aggressive labor leaders fought a tough, no-holds-barred battle that caught management people off balance.

While management struggled to keep its head above water, union propagandists sold a one-sided bill of goods to employees and the general public. To make matters worse, some companies were convinced that the better part of valor was to say as little as possible about their philosophy and policies.

Management Sees The Light — But this gradually changed over the years. After catching its second wind, management saw the value of telling its side of the story. It found that the workers wanted to know what management was thinking and doing. Not only that, it learned that the resulting greater understanding made its job easier.

Today, metalworking management ranks good communications No. 1 among the factors it considers most important to the promotion of better employee relations.

Importance Stressed — Time-after-time in their replies to THE IRON AGE questionnaire, management people stressed the importance of keeping employees and union leaders informed about the company. Communications was implied even when it was not mentioned specifically.

The standing of communications in the thinking of management probably is at an all-time high. American Management Assn. learned this recently when it announced the start of a course in communications. As one AMA staffer put it, "They're climbing through the windows to sign up."

What GE Says—This is the way they look at it at the Holyoke, Mass., plant of General Electric Co.:

"Most grievances are caused by poor communications . . . Only

with good communications can you get understanding. With understanding, problems are resolved."

Management feeling on this point is about the same whether it is dealing with a union or not.

R. J. Dallman, of the Falk Corp., Milwaukee, which has no union, says he considers " 'Up and Down' communications—that is the free flow of information up the line as well as down" as the most important factor in labor relations.

A Job For Experts—The second lesson that management has learned over the years is that labor relations are no "do-it-yourself" proposition. This is implied in the importance now attached to a "fair but firm" policy in dealing with unions and workers.

In its early dealings with unions, management often found itself trapped by its eagerness to keep peace in the family. In so doing, it frequently learned too late that peace-at-any-price established precedents that came back to haunt the industrial household. It was in this area that the labor relations executive first established his value to top management.

Stand Firm, But—"Be fair, but don't let yourself be pushed around," says Oliver Corp., of Cleveland. "Be prepared to stand on your own two feet if you are right. But if you are wrong, correct it and don't be stubborn to save face."

"Be consistent, firm and fair in all decisions," echoes National Malleable and Steel Castings Co., Cleveland. "Settle grievances promptly, basing all settlements on contract provisions."

Adds P. R. Mallory & Co., Indianapolis:

"Be firm but fair and live within your union contract."

Some companies feel there is a need for more cooperation from the other side of the table. There were complaints of a negative attitude on the part of some union leaders. One firm's comment on the question of how labor-management

relations could be improved was short and to the point: "With our union it can't be done."

What Timken Thinks — Particularly outspoken on this point was Timken Roller Bearing Co. Says Timken: "Make them (union) adhere to the contract as well as the company. It would help if the unions were more honest and reliable in their dealings with their members, the companies, and the public."

Cooper-Bessemer Corp., Mount Vernon, O., recognizes the political nature of unions in its views on how to improve labor relations:

The Political Angle — "Straight forward, fair handling of grievance and negotiating situations. Respect for and understanding of the political nature of the union organization by management on the one hand. On the other, helping the union officers and members to understand the responsibilities of industrial management to the various segments of the corporate society — shareholders, customers, employees, and the public."

Micromatic Hone Corp., Detroit, feels that the well-being of company and workers is inter-related and that this point should be brought home to all employees:

"It is impossible to have long-term individual success independent of company success. Without considerable elaboration, it must be established that the ultimate fundamental objectives of a company and the people who work in a company are the same."

Blueprint For Peace — Beech Aircraft Corp., Wichita, Kan., which has not had a work stoppage in its 25-year history, 20 of them under a union contract, outlined this six-point formula for maintaining good labor relations:

1. A management which gives continuous effective attention to the maintenance of good labor relations.

2. A union mature enough to permit a continuing fair interpretation of the union-management agreement.

3. A clearly written union contract which is flexible enough to permit fair-minded administrators of the contract to meet unusual developments with workable solutions.

4. A supervisory group extremely well informed concerning the terms of the contract, and schooled in methods of implementing all parts of the agreement.

5. A group of union stewards who likewise are thoroughly schooled in the terms of the contract and their responsibility thereunder.

6. A desire on the part of both management and the union to settle complaints and grievances promptly and at the lowest possible supervisory level.

Management on Labor Relations

QUESTION: What do you think is the biggest single factor in promoting good labor relations?

Good Communication

"A frank discussion with union committees on all matters directly or indirectly affecting the employees. . . . By frank discussion, we mean keeping the cards face up on the table at all times. These discussions must take place before decisions are finally made and before any action is taken."—**Brown & Sharpe, Providence, R. I.**

"The biggest single factor in promoting good union - management relations is a well-trained and well-informed first line supervisory force."—**SKF Industries, Philadelphia.**

"Direct factual relations. Both sides must be governed by intent of contract rather than interpretation of contents. Present facts on any controversy no matter how small to proper union representatives to prevent knowledge through rumor medium."—**Foster Wheeler Corp., Danville, N. Y.**

". . . Perhaps one of the greatest is an effective communications program with the members of the union in your plant. Most employees want to know more about their company. If we fail to keep them informed, their opinions will usually be biased and they will act accordingly."—**Armco Steel Corp.**

Fair but Firm

"The treatment of all employees in a fair and equitable manner without regard to their union affiliation. . . . "—**Electro-Motive Div., General Motors.**

"Establishing a reputation for fairness in all employee relations matters; attempting to settle matters in a manner calculated to be fair to both the company and the employees. . . ."—**Grayson Controls Div., Long Beach, Calif.**

"Fairness but firmness. . . . Standing firmly on matters of principle; not compromising in this field; no 'deals' with union; cards-on-the-table negotiations." — **Bath Iron Works, Bath, Me.**

"Being consistent, firm and fair in all decisions. Settling grievances promptly, basing all settlements on contract provisions." — **National Malleable & Steel Castings Co., Cleveland.**

". . . Management takes the position that it is responsible for managing the plant as well as maintaining discipline among the employees. . . . This . . . plus a fair but firm approach . . . represents the single factor which must be considered by every industrial organization." — **AC Spark Plug Div., Milwaukee.**

Greater Understanding

". . . Shop stewards and foremen with a complete knowledge of the contract so that problems can be handled promptly."—**Allegheny Ludlum Steel Corp.**

"A complete and mutual understanding of why we are in business." — **Link-Belt Co., Philadelphia.**

". . . The largest one factor in good labor-management relations is mutual understanding, particularly at the first level. The line foreman must understand the steward's main objective . . . (is) to represent people with a gripe. . . . The steward on the other hand must realize the foreman has a job to do and . . . a desire to do that job . . ."—**Chrysler Corp., Kokomo, Ind.**

"A mutual understanding of the problems of each party."—**Timken-Detroit Axle Co., Oshkosh, Wis.**

Honesty

". . . Honesty, fair play . . . Stick to contract, give union all that's coming to it under the contract . . ."—**Vanadium Corp. of America, Niagara Falls, N. Y.**

"Tell them the truth at all times; be fair and firm, particularly in the administration of our union contract." — **Westinghouse Electric Corp., Columbus, O.**

"Honesty, fairness, firmness—in all dealings with employees."—**Borg-Warner Corp., Effingham, Ill.**

"Honesty, firmness, information."—**The Lamson & Sessions Co., Cleveland.**

Mutual Trust and Respect

"Mutual trust between company employees in charge of bargaining with the union and union officials. There is no question in my mind that this is the outstanding factor necessary for good union-management relations."—**Auto Specialties Mfg. Co., St. Joseph, Mich.**

"Respect the personal dignity of every employee and every union representative."—**The Dow Chemical Co., Bay City, Mich.**

"The basic factors required to promote good union-management relations are the development of confidence in each other's integrity, an understanding of each other's problems . . ."—**Parish Pressed Steel Div., Reading, Pa.**

"Intelligent cooperation between management and the union. This necessitates a progressive management group, union leaders sincerely interested in the company's progress, and a posture on the part of each that true collective bargaining will solve virtually all situations."—**Ford Motor Co.**

"Sincere desire to see that employees get fair treatment regarding wages, fringe benefits and working conditions . . . Sincere effort to look at problems from the employees point of view."—**Morgan Engineering Co., Alliance, O.**

"The biggest single factor in good union-management relations is a sense of fairness on each side. For management, this requires a willingness to treat the employees as equals, to deal fairly but equitably, to keep its word scrupulously."—**Elliott Co., Ridgway, Pa.**

"The development of the employees' and union representatives' confidence in management's handling of (a) the business, and (b) its labor relations policy and practice in a manner which will result in long-range benefits to both."

Grievances

"A sincere desire by both parties to get along, plus prompt and fair settlement of deserving grievances with a firm stand on the undeserving."—**Buffalo Forge Co., Buffalo, N. Y.**

"Settlement of grievances promptly or stating reasons for disagreement with union. Making it easier for any employee to discuss company affairs with management."—**R. K. LeBlond Machine Tool Co., Cincinnati.**

"Prompt and honest settlement of all grievances regardless of their immediate importance." — **Dana Corp., Fort Wayne, Ind.**

"Realizing people are our most important asset, believing in what is right and fair rather than who is right, and in settling any and all problems as quickly as possible."—**Atlantic Steel Co., Atlanta.**

"Settle grievances as quickly as possible. Periodic meetings with union committee to discuss mutual problems before they reach the grievance stage."—**The National Acme Co., Cleveland.**

Golden Rule

"Honestly follow our company-union labor agreement and have the union do the same. Follow the Golden Rule."—**De Vilbiss Co., Toledo, O.**

"The practice of the Golden Rule and good communications."—**Thompson Products Co., Cleveland.**

Live Up to Contract

"A realistic understanding of the moral obligations, even beyond the technical requirements of a signed union-management contract . . ."—**Monroe Calculating Machine Co., Orange, N. J.**

"A consistent management policy which is aimed primarily at treating all individuals fairly regardless of contractural obligations . . ."—**American Brass Co., Torrington, Conn.**

"Live up to the provisions of the union agreement and maintain an employer-employee relationship with the union officials. Extend courtesies to the union officials on a personal basis . . ."—**Taft-Peirce Mfg. Co., Woonsocket, R. I.**

Approach

"Mature, objective attitudes and actions on the part of management and union leaders tends to foster 'good' labor relations. Failure on the part of either party will doom the relationship to the mediocre or poor level."—**Cleveland Pneumatic Tool Co., Cleveland.**

"Being factual and objective about union-management relations. Instruct and train frontline supervisors in the proper methods of dealing with the employees."—**National Malleable & Steel Castings Co., Cicero, Ill.**

"Management's basic approach to collective bargaining is founded upon a sincerity which puts all the cards on the table, a flexibility which leaves no room for dogmatism or irrational stubborness, and a firmness which assures that management will not knowingly submit to any unjustified encroachment on its rights from the other side of the bargaining table."—**Sharon Steel Corp., Sharon, Pa.**

"Dealing openly and objectively with the union is the most important factor in promoting good union-management relations. Such open and objective dealing has two aspects: (1) full discussion and ready exposure of all pertinent facts in the instance of grievances, and (2) advance notice to appropriate union representatives in the instance of any action which involves a change from the customary or existing pattern of things."—**U. S. Steel Corp., Pittsburgh.**

Fair Wages

"Teamwork and human relations; respect the dignity of each individual and recognize the importance of his job in achieving the continued growth and prosperity of the company for the benefit of all; pay fair wages and salaries, supplemented by fair benefits for their services; make every effort to provide steady employment . . ." —**Kaiser Steel Corp.**

"Job security and wages."—**Midvale-Heppenstall Co.**

"There is still no substitute for maintaining wage levels and fringe benefits."—**Name Withheld.**

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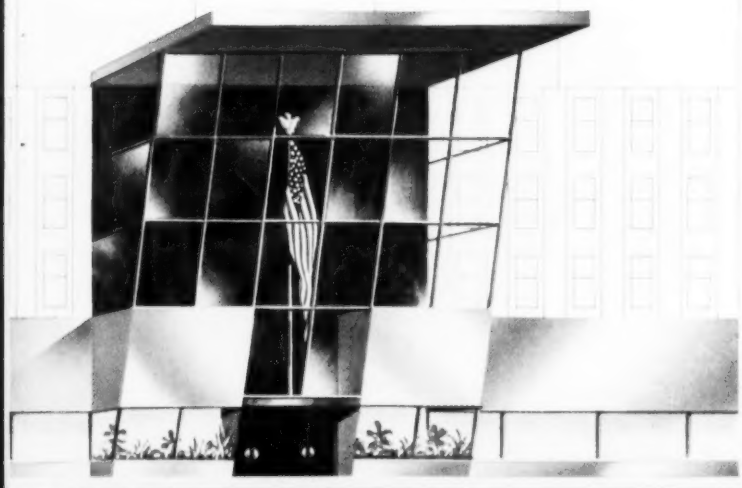
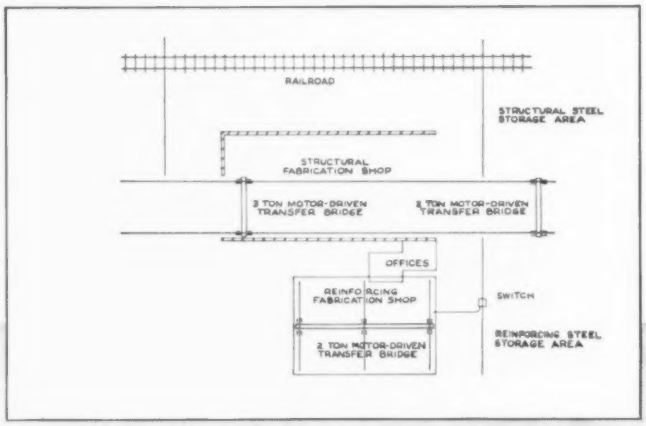
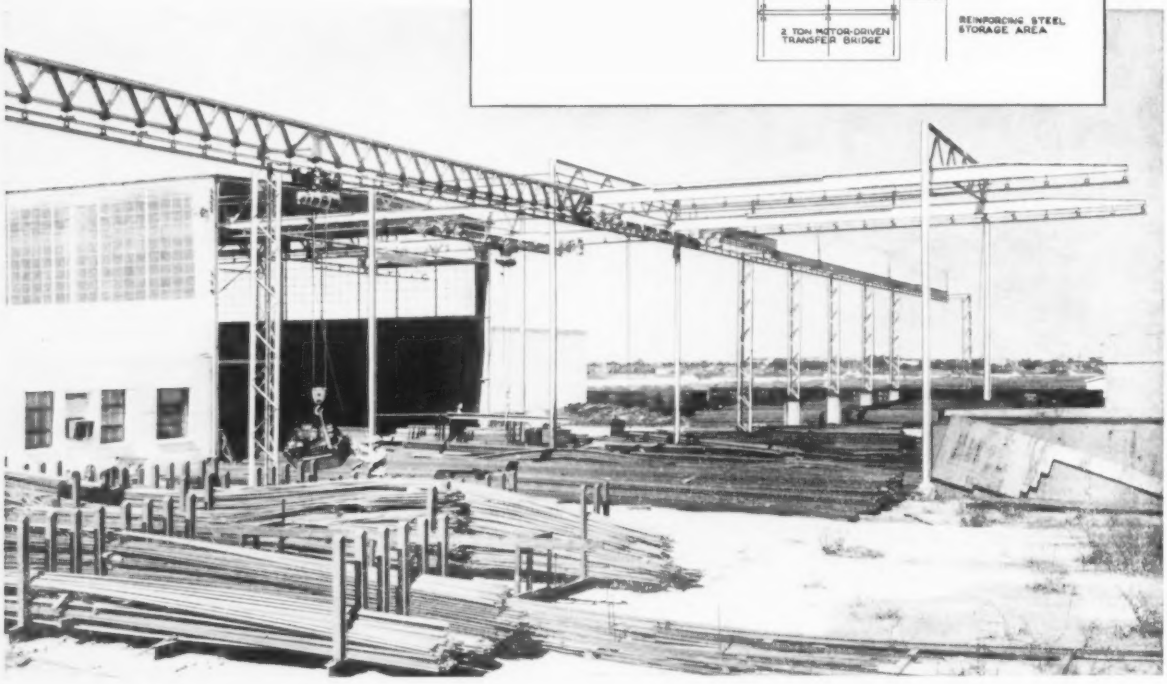


UNITED *can serve you no matter where in the world you are.*

"Inside-outside" Tramrail System
BOOSTS STRUCTURAL SHOP PRODUCTION 66%

Although Thornton Steel Co. is an important steel fabricator and could readily make equipment to handle its materials, it has installed Cleveland Tramrail throughout its yard and plant because it recognizes the importance and advantages of materials handling equipment especially designed and built for the purpose.





MAN-HOURS required for fabrication of trusses and various steel work for buildings were cut an average of 40% with a Cleveland Tramrail system by Thornton Steel Co., Fort Worth, Texas.

Thus, without expanding the plant structure, or adding to fabricating machinery or working force, production was stepped up 66%.

Being situated in a part of Texas where winters are not severe, much of the work is carried on out-of-doors. Tramrail transfer cranes and carriers serve both inside and outside the plant. This enables delivering materials from various parts of the yard to any part of the shop without rehandling. Thus materials are moved fast and efficiently in the least possible time.

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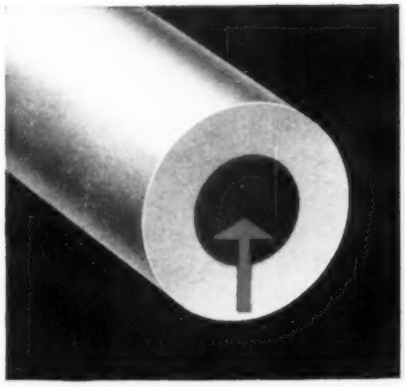
a hole here makes waste...



a hole here saves waste

Crucible Hollow Tool Steel cut sections eliminate the waste and cost of drilling out solid rounds to make ring-shaped or tubular steel parts, or tools with a center hole. By using these hollow bar sections, cut to length, you do away with unnecessary cutting, drilling, and boring operations, increase machine capacity, and cut scrap losses.

These hollow sections, in just about any O.D. and I.D. combination, or thickness you want, are *immediately* available in five most popular Crucible grades: KETOS oil hardening, SANDERSON water hardening, AIRDI 150 high-carbon high-chromium, AIRKOOL air hardening, and NU DIE V hot-work tool steels.

Call your nearby Crucible warehouse for more information, or for speedy delivery. *Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*

See us at N.A.P.A. Inform-A-Show
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Booths 1, 2, 3, 4.

CRUCIBLE first name in special purpose steels

Crucible Steel Company of America

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Horsepower May Get Soft Pedal

It's a Choice Between Speed or Safety

Rumblings from Washington are causing concern among some automakers.

Too much emphasis on horsepower could clamp a legislative lid on engine size.

The industry needs bigger engines to meet future requirements.—By T. L. Carry.

■ Speculation on whether or not the end of the horsepower race is in sight has come up with new vigor in the Motor City. Observers feel that, although engine horsepower will continue to climb in succeeding years, the industry will stop blowing its horn about it.

Main reason for the opinion is the report that General Motors Corp. is seeking an industry-wide agreement that would suppress horsepower advertising and ban official participation in such events as NASCAR Speed Weeks.

Speed vs. Safety—In addition, the agreement would supposedly prohibit producers from advertising performance and speed records at such events. GM reportedly has been quietly polling various producers through the Automobile Manufacturers Assn. as a test of industry sentiment.

Many reasons are being offered for the move. It's becoming increasingly difficult for the industry to reconcile the speed of its cars with a safety program.

Popular Concept — Technically, horsepower itself has very little to do with speed. Engineers can cite statistics to prove that, although horsepower has increased greatly in recent years, top speeds of cars have not gone up accordingly.

Such a sophisticated attitude is true, but the fact still remains that as far as the public is concerned, hp means speed. Sales departments have encouraged this misconception for obvious reasons.

Possible Political Football—This attitude, along with the ever-increasing number of fatal accidents on the highway, has caused some ominous rumblings from Washington.

This is the second reason for the

TAKEOFF: Car leaves ground (left) while undergoing rugged test at Ford Motor Co.'s new Romeo, Mich., proving ground. Others (above) are checked out on a 29 pct grade. The 3880-acre site has a 5-mile oval speed track, a 2.5-mile straightaway, and three durability routes totaling over 10 miles. (See P. 109.)

YESTERDAY: Rivets
TODAY: High Strength Bolts

TOMORROW? More high strength bolts —for that is the new way of erecting steel structures.

Less and less will there be the raucous rat-a-tat-tat of riveting, jangling the ears and nerves of the community. In its place, the faster, quieter, better technique of bolting.

What has helped make this better way of multi-story construction possible? RB&W high tensile bolts. These bolts make stronger connections than rivets. They can withstand tremendous stresses, can tie a towering steel structure together in less time than rivets . . . at less overall cost.

RB&W—A MAJOR SUPPLIER TO ALL INDUSTRY

A leader in its field for over 112 years, RB&W turns out the finest fasteners for virtually *every* major industry. It is the *largest independent producer* of high strength bolts for construction.

Modern facilities, new techniques, long experience . . . all combine to make RB&W fasteners truly the "strong point of any assembly."

CONTACT THE RB&W "FASTENER MAN"

Standard fasteners properly applied can be a cost saver. Put it up to the RB&W "Fastener Man" to show you. Contact your nearest RB&W office.

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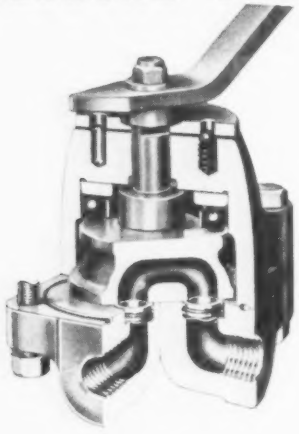
Plants at: Port Chester, N. Y.; Coraopolis, Pa.; Rock Falls, Ill.; Los Angeles, Calif. **Additional sales offices at:** Ardmore (Phila.), Pa.; Pittsburgh; Detroit; Chicago; Dallas; San Francisco. **Sales agents at:** Milwaukee; New Orleans; Denver. **Distributors from coast to coast.**

RB&W FASTENERS - *Strong Point of any assembly*

DO YOU **CONTROL** YOUR HI-PRESSURE CIRCUITS?



1. ***Can you shut off flow tightly?***
2. ***Can you throttle gradually?***
3. ***Can you get full flow?***

1 ***MANUAL "SHEAR-SEAL" VALVES***

(1500, 3000 and 6000 P.S.I.)

are leakproof and stay leakproof for years of service with little or no maintenance; no internal port to port leakage in the detented positions and, of course, no external leakage. Sealing qualities actually improve with use, due to wear compensating lapping action of "Shear-Seals."

2 You get excellent throttling, smooth action to any degree of flow without fighting the fluid pressure.

3 Quick as a quarter turn of the handle you can open the full flow (or shut it off) with surge dampening action, because the round tubular passages have no spools or poppets obstructing flow.

BARKSDALE VALVES

5125 Alcoa Avenue, Los Angeles 58, California

Ask for bulletin 5-H, -A and -W.

"SHEAR-SEAL" 4-WAY VALVES, 0 TO 250 P.S.I. AIR

$18.50 List Price*

*$18.50 is the list price for the ¼" port size and $19.50 for the ⅜" less usual quantity discounts.

NO MORE AIR VALVE TROUBLES FROM DIRT OR **CORROSION**

(AND WITHOUT COSTLY FILTERS AND OILERS)

Important Savings	Low initial cost. Need no oilers and filters (time and materials savings).	All components are corrosion resistant.
Low Maintenance	Sealing qualities do not diminish with long, continued use.	Wear compensating "Shear-Seal" design.
Long Service Life	No production delays. Maintenance (rarely needed), without disturbing plumbing.	Lapped metal to metal sealing members.
Not Critical to Dirt	No scoring or binding. (As with spool or poppet designs.)	Flow is through "Shear-Seals." Sealing surfaces remain in constant intimate contact.
No Creeping Cylinders	Leakproof closure. (No internal port to port leakage.)	Maintained through lapping action of each operation.

Ask for bulletin A-5.

Foot operated models with or without spring return to reverse or to center are $24.50 list for the ¼" and $25.50 for the ⅜" valve less quantity discounts.

BARKSDALE VALVES

5125 Alcoa Avenue, Los Angeles 58, California

Automotive Production

WEEK ENDING	CARS	TRUCKS
May 18, 1957	126,223*	23,577*
May 11, 1957	125,924	23,198
May 19, 1956	105,763	20,902
May 12, 1956	105,552	22,121
TO DATE 1957	2,662,600	441,500
TO DATE 1956	2,593,100	473,200

*Estimated. Source: *Ward's Reports*

attempt to stifle the horsepower race. Politicians are quick to sense public feeling on any subject, but especially on highway safety. And they are also quick to find a whipping boy.

Speed Limit Unpopular—There have been threats to limit by law the speed at which a car would be able to travel. Most talked about possibility along this line is a law which would require the industry to put governors on its cars.

Nobody connected with the industry wants this to happen and perhaps GM is trying to forestall the possibility. It is hard to tell how the rest of the automakers feel about GM's idea because nobody will admit that they have been approached on the subject.

How Industry Feels—However, it appears that there may be some opposition to the plan. It ranges from sour grapes to bona fide complaints. Nobody wants to be quoted on the subject but here are some of the comments picked up in a survey of various automakers.

"General Motors will be making major changes on the Pontiac and Chevrolet next year. In addition, Buick and Olds have big styling changes in the works. The result is that GM won't have to emphasize power to sell its cars."

Poor Highways Hit — "On the other hand, producers that have scheduled only facelifts for 1958 are likely to be stuck with few selling points if they can't talk about increased power."

Another competitor feels that the idea is unfortunate from a technical standpoint.

"Main reason for the increase in highway fatalities is that there are many more cars on the road today than there were 20 years ago. Highway improvements have not kept pace with increased auto production."

More Power, Less Talk—In any case, it's a safe bet that regardless of whether GM is actively seeking an agreement to de-emphasize horsepower, you will hear a lot less about it next year and for several years to come.

Ford Opens New Test Track

Ford Motor Co's Michigan proving ground at nearby Romeo is being officially dedicated today at the company's second annual stockholder's meeting.

Completion of the new proving ground gives Ford the most extensive road testing facilities in the auto industry. With the new area, the company now has a total of 8080 acres for testing cars, trucks and other vehicles.

Its Features—The Romeo facility takes in 3880 acres. It includes a 5-mile high speed test track that is five lanes wide. The track is designed for neutral speeds of 140 mph without any side thrust and 180 mph on the turns. There is also a 2.5 mile straightaway for testing acceleration and braking performance.

One of the main reasons for building the Romeo facility was to provide the company with a network of good, medium and bad roads, close to its main offices, for car endurance tests.

Testing Is Controlled — Previously, Ford had to use public roads in the area for testing. Unlike public roads, the facilities at Romeo will remain consistently good or constantly bad year after year so that precise performance tests can always be made.

The Romeo facility has three durability routes. The first is 7.2 miles long. It consists of dips and sharp curves and has bumps deliberately built into its concrete surface to simulate road hazards commonly experienced by the average driver.

THE BULL OF THE WOODS — By J. R. Williams

WHY, IT'S OKAY-- NOT A THING WRONG WITH IT! SEE HERE--
WOT'S TH' MATTER WITH YOU? IT WORKS FOR US!
EVERYTHING SEEMS TO WORK FOR SOMEBODY ELSE--AN' IT MAKES YOU HESITATE TO CALL FOR HELP!
YEH, TH' INSULTS MAKE YOU LEAN ON YOURSELF AN' THEN THEY'RE MAD 'CAUSE YOU DON'T NEED 'EM!
THE STIMULANT
J.R. WILLIAMS
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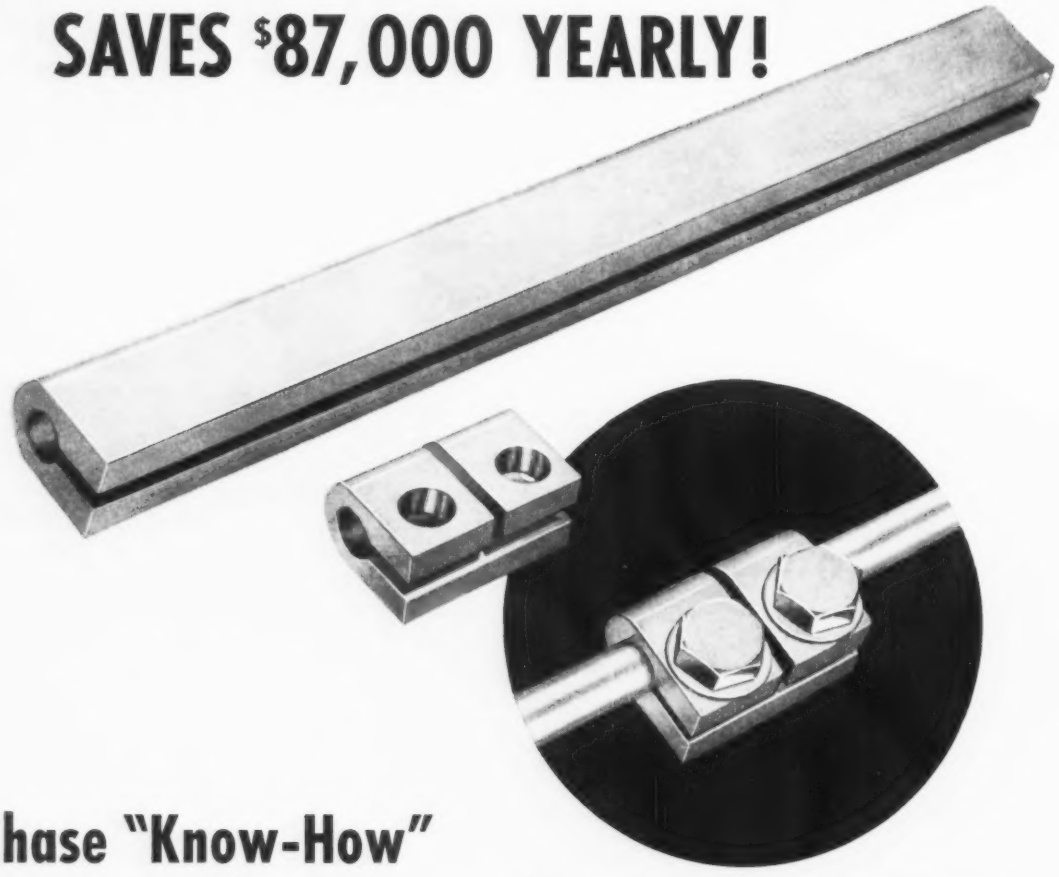
"IMPOSSIBLE" BRASS EXTRUSION SAVES $87,000 YEARLY!



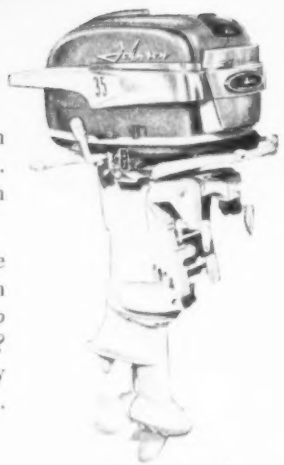
Chase "Know-How" cuts costs for Johnson Motors

(world's largest manufacturer of outboard motors)

The shift-rod connector on rugged, dependable Johnson Sea-horses had to be strong enough to hold up under severe stress and compact enough to operate in the clearances available on smallest engine models.

Stamped parts were completely unsatisfactory. Parts machined from rod were too bulky for versatile applications. So they checked with Chase to find out how closely a brass extrusion could approximate their requirements. And Chase "know-how" came through beyond their expectations!

Chase mill techniques proved to be so precise that the required extrusion *needed no additional machining to cross-sectional dimensions!* Result? An annual saving of approximately $87,000 *plus* a much better design.



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Business Next for Racket Probe

Management Side Will Also Get Scrutiny

It's Dave Beck who's in hot water today from Senate committee.

But any management involved with racketeering is apt to be in the same position when probe turns to the other side.—By G. H. Baker.

▪ Top management should prepare now for close scrutiny next year from the Senate committee looking into racketeering.

This year, the committee is taking a sharp, close look at Dave Beck and other labor leaders who have been engaged in questionable activities.

Management's Turn—Next year, however, the committee will swing its spotlight on management. And the committee will be just as rough —or rougher—on wrongdoing by management. You can count on it. Management officials who have been knowingly conniving with racketeers should stop smirking at Beck, because the committee will put them on the hot seat early in 1958.

Keep in mind the legal name of the committee: "Committee to investigate improper activities on labor-management relations." This year, it's labor's turn. Next year, management.

Political Implications — Union officials find one bright spot in the fact that their turn at being investigated came first: This year is not an election year, and therefore labor cannot take any defeats at the polls as a result of the wrongdoing that's being exposed. But next year is an election year. As usual, the entire House of Representatives and one-third of the Senate will be at stake. Any wrongdoing at the management level that's exposed next year could react adversely with the voters.

The Senate committee is even now lining up some red-hot charges to hurl at management next year.

Tech Data Policy Clarified

Businessmen with defense contracts get a clearer ruling from the military on their right to hold on to their own technical information.

A new change in the Armed Services Procurement Regulation sets up this policy: The government is to acquire only the industry-produced data it specifically needs. Definite limits on government use of the data are expected to improve understanding with contractors.

Data concerned include drawings and technical written matter provided by a contractor in connection with defense work. The policy now defined refers to three categories of data — proprietary, operational, and design.

Why Businessmen Leave Washington

Self-Interest Implied — A congressional committee wants to impose closer checks on businessmen who come to Washington to advise the government.

Present rules are lax, it is charged, and afford a wide-open opportunity for behind-the-scenes collusion among companies that hope to divide up any given market and then share it with their competitors.

Some Left Out—Furthermore, it is claimed, companies that are too busy or too small to send spokesmen to Washington industry-government meetings sometimes are left out of schemes to allocate scarce materials within an industry. But big companies that can afford to send their men to Washington seem to get all the supplies they need, it's contended.

Government officials whose job it is to enforce the antitrust laws have long contended that too many industry advisory committees are breeding grounds for monopoly-type agreements.

Reform Suggestions — Here's what is being proposed in the way of reforming industry advisory committees:

Advisory committee should be set up only when specifically authorized by law.

Committee meetings should be run by full-time government employees, not industry officials.

Complete minutes of all meetings should be taken.

Committees should operate only to advise the government.

Secretary of Commerce Weeks is opposing the new rules. To change the existing setup would be to choke off the flow of "valuable information" the government now receives from industry, he maintains.

ÆSOP'S FABLES No. 4

Mr. Crow couldn't remember when he had ever been so thirsty . . . then, he came upon a large pitcher partially filled with water. This was fine except that poor Mr. Crow, try though he did, could not get his beak down into the pitcher far enough to reach the water. Finally, weakened and more thirsty than ever, he hit upon an idea . . . one by one he dropped pebbles inside the pitcher until the water level reached the brim . . . at last the Crow was able to quench his thirst.

Moral:
Necessity is surely the Mother of Invention.

. . . and, the *necessity* of a superior longer lasting refractory for forming monolithic hearths certainly brought about Botfield's "invention" of their popular ADAHEARTH . . . a chemically neutral chrome base refractory with a plastic consistency, ADAHEARTH has unusually strong air-set; resists spalling, molten metal, and abrasion; has low porosity, high density, absolute homogeneity of structure . . . ADAHEARTH requires fewer man-hours to install . . . insures cleaner forgings and a faster-working furnace.

Write for further literature . . . Yellow Pages of 'phone directory have your nearest "ADAMANT" Distributor.

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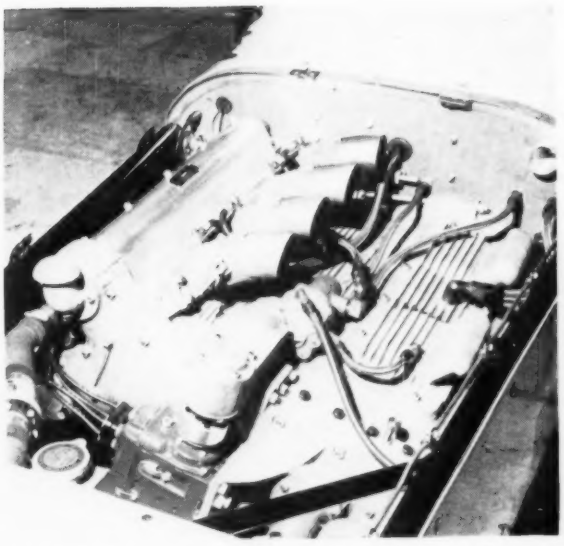


SIDESADDLE: Belond Exhaust Special (1) features . . . engine mounted on its side, 18° from horizontal.

West Paces Race Car Designing

Farwestern cars and engines again dominate the famous 500-mile race at Indianapolis on Memorial Day.

Most talked-about entry features an engine lying on its side. —By R. R. Kay.

▪ Everything is in high gear for the fastest race in Indianapolis history. The once-a-year 500-mile speed classic will again be packed with thrills for racing fans all over the U. S.

Prediction: It will take 140 mph to get one of the 33 starting positions. Average speed for the race should hit a sizzling 136 mph.

Engine On Its Side—California-made engines and cars will again rule the roost. All but four of the 54 entries will mount the famous 4-cylinder Meyer and Drake Offenhauser engine. And all but a handful of the cars were built in Frank Kurtis' Glendale, Calif. shop.

Here's a preview of what the 175,000 ticket holders will see at the track on May 30: Cars will be narrower, smaller, lower, and lighter.

Watch the Belond Exhaust Special—this year's most talked-about car. It's something new in design thinking. (See photo.) The engine lies on its side—18° from horizontal. It's done to improve weight distribution, lower the center of gravity, and give better visibility. Can a car engine lie on its side and run successfully? The Indianapolis grind will tell.

Piston Area Decreased — New engine specifications are in effect this year. The Speedway cut piston displacement from 274 cu in. to 256 cu in. for non-supercharged engines, and from 183 cu in. to 171 cu in. for supercharged.

The smaller displacement delivers about 10 pct less horsepower, however race way drivers will probably travel as fast as ever.

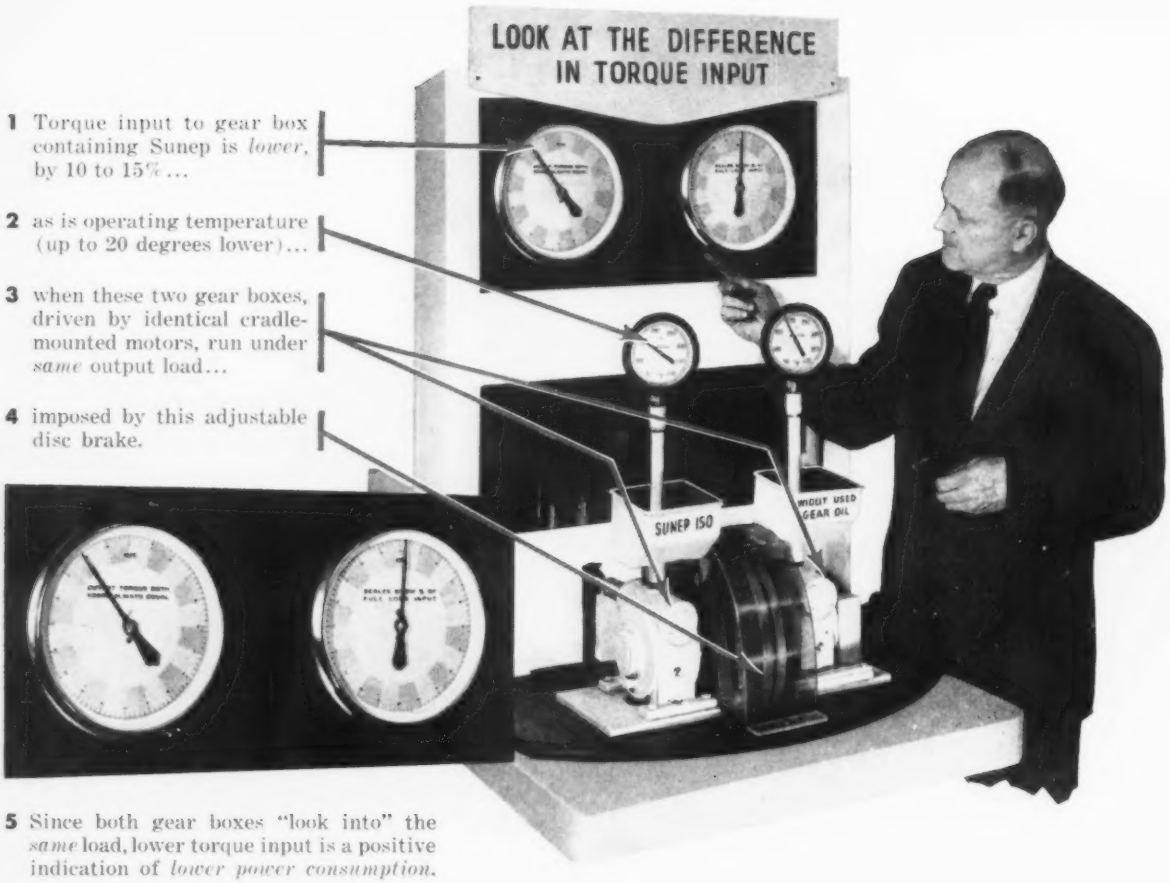
Probably the largest number of new cars in Indianapolis history will compete for starting positions. Of the 22, Kurtis built 14.

Metalworkers on the Coast have a big stake in the multi-million dollar racing and hot rod market. About 150 southern California companies make speed equipment —accessories that make a car go like a bomb.

Vertijet Introduced

It's now a reality. A new jet plane that takes off and lands straight up and down—and flies like a conventional plane once it's aloft. With 10 years development and $10 million in the project, the U. S. Air Force took the wraps off the VTOL (vertical take-off and landing) research plane, the X-13 Vertijet. It's built by Ryan Aeronautical Co., San Diego.

The plane doesn't require long runways or conventional landing gear and gets high up in a hurry.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1 Torque input to gear box containing Sunep is *lower*, by 10 to 15%...
2 as is operating temperature (up to 20 degrees lower)...
3 when these two gear boxes, driven by identical cradle-mounted motors, run under *same* output load...
4 imposed by this adjustable disc brake.
SUNEP 150
5 Since both gear boxes "look into" the *same* load, lower torque input is a positive indication of *lower power consumption.*

This test rig proves...

SUNEP CUTS POWER CONSUMPTION, REDUCES OPERATING TEMPERATURES

TIME AND AGAIN, under equal operating conditions, Sunep® gear lubricant has demonstrated its superiority over competitive oils. Sunep is a high-quality, extreme-pressure lubricant that is also recommended for screws and heavily loaded bearings.

In addition to extreme-pressure characteristics, Sunep has the ability to combat rust and corrosion. All additives are compatible and do not drop out during use or prolonged storage. These advantages add up to savings in money and equipment for you.

For complete information about Sunep oils, call your Sun representative or write to SUN OIL COMPANY, Philadelphia 3, Pa., Dept. IA-5.

INDUSTRIAL PRODUCTS DEPARTMENT

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ODM Prepares Tool Lease Code

Aim: End Confusion By Unified Policy

A fair shake for all—tool builders, distributors, users and government itself is aim of recommended provisions.

Included: uniform lease terms, rentals based on cost of acquiring tools.—By E. J. Egan, Jr.

▪ The Government seems about ready to install a uniform policy for leasing its machine tools to defense contractors. As outlined by Gordon Gray, director, Office of Defense Mobilization, it should give builders, distributors, users—and the Government itself—a fair shake.

Recommended provisions for a standard leasing code were worked up by an inter-agency task force and presented to Mr. Gray for his consideration.

Here Are Ground Rules—As he explains it, the new policy would call for:

(1) Uniform provisions with respect to lease terms, purchase and renewal options, restrictions on use, maintenance, installation charges, transportation and removal costs, and rental rates.

(2) Rental rates based on the acquisition cost of the tools. Graduated rent scale would range from 1½ pct per month for new equipment to ½ pct for tools 13 or more years old.

(3) All users, big or small, to pay actual rent. Previous practice of allowing some firms to negotiate an end-product price-offset would be outlawed.

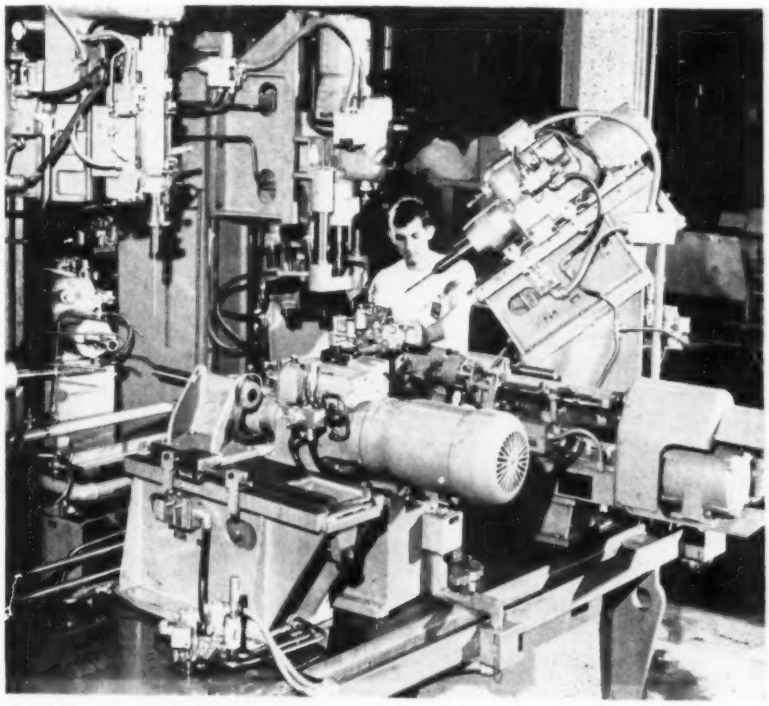
(4) Legislation to provide that all rental fees will revert to the defense agency leasing the equipment. This will give these agencies sums they can use for equipment modernization, replacement and repair. It will prevent rental fees from becoming "lost" in the Treasury's general fund.

If the recommended policy goes into effect substantially as outlined, it will help clear up one of the murkiest areas in the over-all defense program.

For Defense Only—First step to dispel some of the fog around the Government's machine tool leasing policies came in October, 1953. That's when Arthur Flemming, former ODM director, ordered that Government-owned tools could be leased only for essential defense production.

But squawks about the military's low equipment-rental rates to bona-fide defense contractors are still as loud as ever. Builders and distributors complain that firms with defense contracts won't buy or rent new machines if the Government will lease them tools for "next to nothing."

Poor Connection—Just as loud are the yells from would-be defense contractors who, for one reason or another, can't seem to latch on to any of the low-rent Government equipment. The proposed leasing code could quiet much of this.



HOLES IN A HURRY: New automatic machines speed and simplify complex hole drilling at Hamilton Standard Div., United Aircraft Corp. Multiple operation equipment was built by Hartford Special Machine Co.

INDUSTRIAL BRIEFS

Ninety-Nine Pct Pure — High purity carbon monoxide will be produced in a pilot plant completed by The Matheson Co., Inc., East Rutherford, N. J. Carbon monoxide will be produced of 99 pct minimum purity in 5 cylinder sizes. Matheson now supplies 76 different compressed gases and custom gas mixtures from plants located in East Rutherford, Joilet, Ill., and Newark, Calif.

Move to the Market—The Trane Co., La Crosse, Wis., has selected Clarksville, Tenn., as the site for its southern plant. Approximate cost of construction and equipment for production will be about $2 million. It will manufacture central residential air conditioners for year-round heating and cooling. Production is scheduled for 1958.

Hot Cargo — The Babcock & Wilcox Co. is contractor for the power plant of the nation's first nuclear - driven passenger - cargo ship. A contract has been awarded to the De Laval Steam Turbine Co., Trenton, N. J., to design and furnish the main rotating machinery and associated feed system auxiliaries for the vessel.

Pan American Steel — As the first major shipment to be made under a $60 million loan made to Argentina by the Export-Import Bank, two Westinghouse electric generators are en route to the site of a $250 million steel mill project. The shipment is part of more than $14 million in equipment ordered to date from Westinghouse for the steel mill and its power plant. It will be operated by Sociedad Mixtra Siderurgia.

Southern Outlet—Atlantic Steel Co., Atlanta, Ga., will build a warehouse in Birmingham, Ala. The plant will serve as a southeastern distribution point for aluminum products. Later the company will double its operation at an overall investment of $150,000.

Evening Reading — The Silver Anniversary Edition of the American Society of Tool Engineer's annual Collected Technical Papers is now available. The edition contains 43 separate papers, including the Eli Whitney Memorial Lecture by Louis Polk, and two symposia on ceramic tooling and plastic tooling. Write: ASTE Technical Papers, 10700 Puritan Ave., Detroit.

Royal Location — General Aniline & Film Corp. will construct a $1 million West Coast plant. It will be located at La Habra on the Imperial Highway in Orange County on the outskirts of Los Angeles. The facility will manufacture sensitized materials for the Ozalid Division and will provide warehousing and distribution facilities.

Expedite This — A Rockets and Missiles Dept. has been set up by Standard Steel Works Div., Burnham, Pa., of Baldwin-Lima-Hamilton Corp. The department will be the coordinating body for research, engineering, production and sales in the rockets and missiles field.

Feeling Is Mutual — Mutual Steel Co. has begun grading of land at Grasselli, near Birmingham, Ala., for a steel fabricating plant. Cost of the development is estimated at $175,000. Completion is expected in the fall.

Moving Up North — Texas Instruments Inc. has opened a Semi-conductor-Components Div. marketing office in Camden, N. J. The division is a leading manufacturer and marketer of transistors, rectifiers and diodes, carbon deposited resistors, and panel meters.

Strategic Grouping—Blaw-Knox Co. will combine its New York and Philadelphia sales offices into an Eastern regional sales office which will be located in Haddon Heights, N. J. The move will be completed by August 15, 1957.

Furniture Rearrangement — The Brown - Jordan Co., Pasadena, Calif. and the Varazini Furniture Co., Newport, Ark., major factors in the metal furniture field, have combined their operations in a two-corporation merger based on a 50/50 exchange of stock. The California firm will continue as the Brown-Jordan Co. of Pasadena and the Arkansas operation becomes the Brown-Jordan Corp., Varazini Div. of Newport.

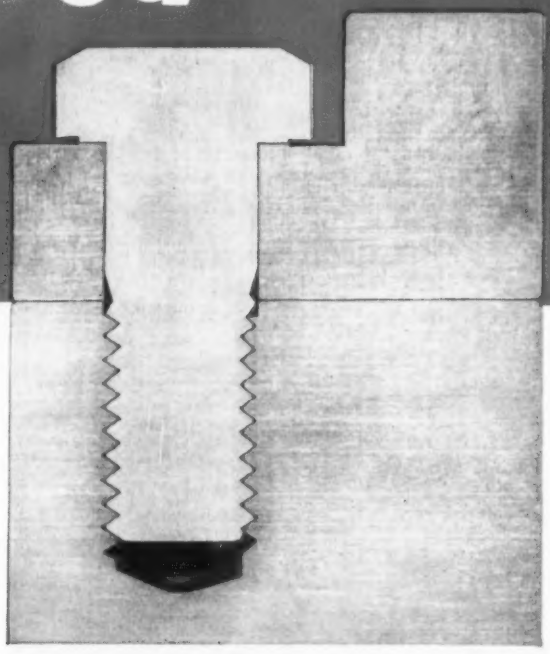
Sister's Helper—A second twin-screw diesel towboat will be built for Island Creek Fuel & Transportation Co., Huntington, W. Va., by Dravo Corp., Pittsburgh. Like its sister ship, the Raymond E. Salvati, which was launched last summer, the new vessel will be used in the Ohio River coal trade. It will be powered by two Enterprise engines with a combined 2560 shaft horsepower.

Change That Letterhead—Newly-elected officers of American Tin Trade Assn. are: President, Meyer Abrams, American Metal Co. Ltd.; vice president, W. S. Borcherding, Borcherding Metals Inc. and W. D. Long, A. Strauss & Co. Elections for the one year term took place at the association's annual meeting in New York.

"Open your eyes boy . . . there are dozens of opportunities around here."

Engineered

TO REDUCE FASTENING COSTS



LAMSON

THE HEAD TO REMEMBER · 1038 · FOR ASSURED PERFORMANCE

1038 CAP SCREWS

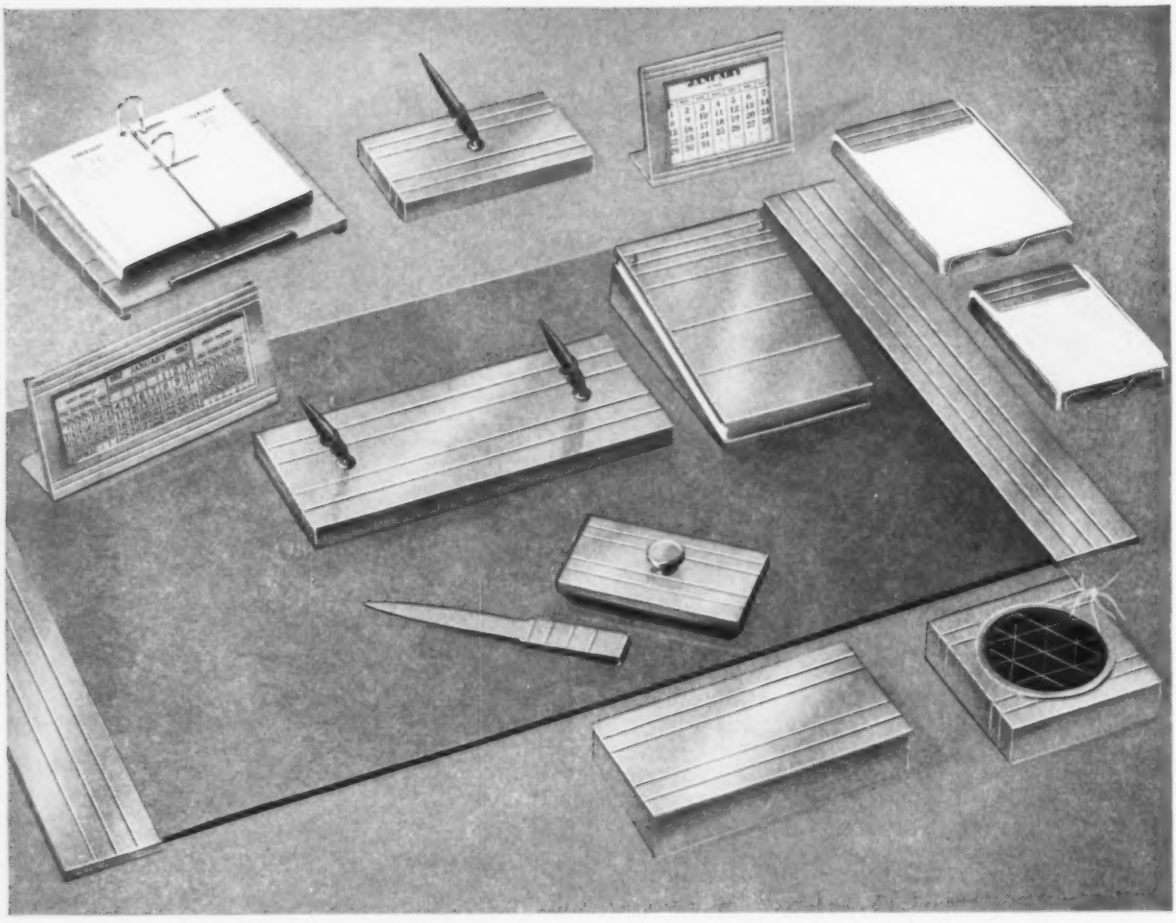
SIZE RANGE ¼" to 1½" in diameter
½" to 12" in length

8 WAYS TO SAVE MONEY BY USING LAMSON 1038 CAP SCREWS:

For any given strength requirement, LAMSON 1038 HIGH TENSILE CAP SCREWS can do the job with a MINIMUM:

1. Initial fastener cost
2. Screw diameter
3. Screw length
4. Tapped hole diameter and depth
5. Drilled hole diameter
6. Handling expense
7. Assembly cost
8. Inventory expense

Write for the special FREE bulletin on Cap Screw analysis



A few of the fine executive desk appointments made of Formbrite by Smith Metal Arts Co., Inc.

For a superfine luster that lasts—superfine-grain Formbrite

Smith Metal Arts Co. uses easy-to-polish, scratch-resistant Formbrite to add value to its line of distinguished desk appointments.

The fine executive desk appointments made by Smith Metal Arts Co., Inc., Buffalo, N. Y., are not just polished to shine. They are brought up to a beautiful deep luster. For their line of brass accessories they use Formbrite,® Anaconda's superfine-grain drawing brass.

They have found that the fine, uniform grain size of Formbrite enables them to give their pieces a superior, more uniform texture. The luster, furthermore, stands up better under handling because Formbrite provides a harder, more scratch-resistant surface.

In order to achieve this fine luster, Smith Metal Arts Co. must do an exceptional amount of polishing and they have chosen Formbrite because of its superior polishing characteristics. By using Formbrite they can achieve their high quality surfaces at savings of 20% over the use of ordinary brass.

See for yourself. Formbrite is a premium product at a nonpremium price. Find out for yourself how its superfine grain, excellent drawing properties, strength, and scratch resistance can help you improve product quality, lower finishing costs. Write for Publication B-39. Better yet, ask for a sample or details on our trial order offer. Address: The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont.

Formbrite

SUPERFINE-GRAIN DRAWING BRASS

an ANACONDA® product

Made by The American Brass Company

Henry A. Arnold, elected president, Olin Mathieson International Corp., wholly owned subsidiary of Olin Mathieson Chemical Corp.

James L. Hamilton, Jr., vice president and general manager of sales, Granite City Steel Co., announces appointment of **John P. Stoll, Jr.,** as district manager, Kansas City.

Samuel R. Parry, elected vice president, Combustion Engineering, Inc., New York.

George H. Acker, elected president, The Cleveland Worm & Gear Co. and The Farval Corp.

Jonathan Kludt, elected executive vice president and general manager, Lincoln Engineering Co., Div., of The McNeil Machine & Engineering Co.

K. L. Steel, named manager, manufacturing and **D. N. Wise,** named manager, engineering, Safety Products Div., Mine Safety Appliances Co., Pittsburgh.

John M. Robinson, elected executive vice president, DeVilbiss Co.; **John M. Ehni,** elected vice president, foreign sales; **Edward J. Etzel,** elected vice president, purchasing.

John K. Carnes, elected vice president, manufacturing, The Globe-Wernicke Co., Cincinnati.

Ralph Carlisle Smith, elected asst. to the president, Nuclear Products-Erco Div., ACF Industries, Inc., Washington, D. C.

Charles H. Good, Jr., elected asst. to vice president, operations-steel, U. S. Steel Corp.

John G. Graham, elected asst. treasurer, Salem - Brosius, Inc., Pittsburgh.

Charles J. Wade, named controller, Adamas Carbide Corp., Kenilworth, N. J.

Jack T. Elmer, named coordinator, quality control, Kaiser Chemicals Div., Kaiser Aluminum & Chemical Corp., Oakland, Calif.

Jack F. Liberatore, named manager, carbon steel and specialities and **Malcolm Smith,** named manager, sheet and strip, U. S. Steel Supply Div.

Howard Dingle, elected chairman of the board, The Cleveland Worm & Gear Co. and The Farval Corp.

Bert M. Walter, elected vice president, Clark Equipment Co., Buchanan, Mich.

George Turner, elected vice president, Clark Equipment Co., Buchanan, Mich.

Henry Duffy, elected vice president, manufacturing, McDowell Co., Inc., Cleveland.

W. M. O'Connor, appointed manager, Amarillo district, Allis-Chalmers Industries Group.

William L. Cressman, appointed asst. general manager, sales, Jones & Laughlin Steel Corp.

T. W. R. Lathan, appointed Los Angeles district manager, Raybestos-Manhattan, Inc., Passaic, N. J.;

J. M. Ehman, named Birmingham asst. district manager; **Nevin L. Rush,** named manager, distributor sales, Philadelphia district; **Julian P. Chilcote,** appointed sales representative, New York district.

Hayward A. Gay, named manager, Machine Tool Div., The Cincinnati Milling Machine Co.

James H. Joyner, named general manager, Pioneer Works, Quaker Rubber Div., H. K. Porter Co., Philadelphia.

Raymond K. Dykema, Jr., appointed Cleveland district manager, sales, Stainless Steel Div., Jones & Laughlin Steel Corp.

John F. Wooddell, named plant superintendent and **Richard E. Marks,** appointed sales manager, Sheffield Foundry Co., Chicago.

B. V. Edmunds, named works manager, Quaker Rubber Div., H. K. Porter Co., Philadelphia.

Dr. Marion B. Geiger, appointed director, general development, Hooker Electrochemical Co., Niagara Falls, N. Y.

Raymond A. Quadt, named director, research and development, Bridgeport Brass Co., Bridgeport, Conn.

Ray V. Burdeno, named plant manager, Betz Div., Bohn Aluminum & Brass Corp., Danville, Ill.

Herbert A. Long, named general manager, operations, Pittsburgh Steel Co.; **John C. Peth, Sr.,** named chief engineer.

Philip O. Geier, Jr., named manager, Products Div., The Cincinnati Milling Machine Co.

H. B. Stafford, named operations manager, Technical Products Div., Mine Safety Appliances Co., Pittsburgh; **N. W. Hartz,** named sales manager.

J. C. Smith, appointed plant manager, Bowling Green, Ky., plant, Detrex Chemical Industries.

Roger A. McIntyre, named director, sales, Horizons, Inc., Cleveland.

Samuel A. Glueck, named general manager, Midwestern Dept., American Smelting & Refining Co.; **Louis D. Alpert,** appointed general manager, Eastern Dept.

C. Donald McLain, appointed research and development manager, Western Brass Mills Div., Olin Mathieson Chemical Corp.

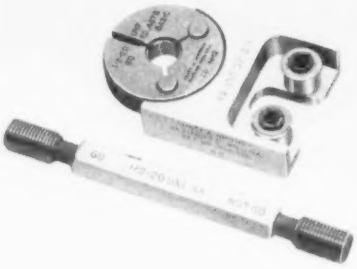
Edwin W. Burne, named manager, employee and plant commun-

(Advertisement)

. . . AND FOR YOUR THREAD-INSPECTION JOBS BEST HANDLED BY P&W CONVENTIONAL GAGES . . .

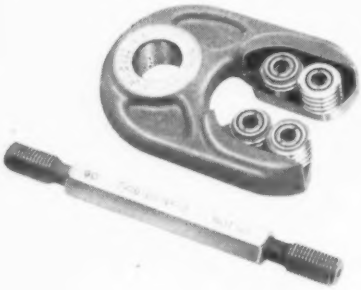
"GO" and "NOT GO" RING GAGES

provide a functional check at maximum metal limit and a pitch diameter check at minimum metal limit.



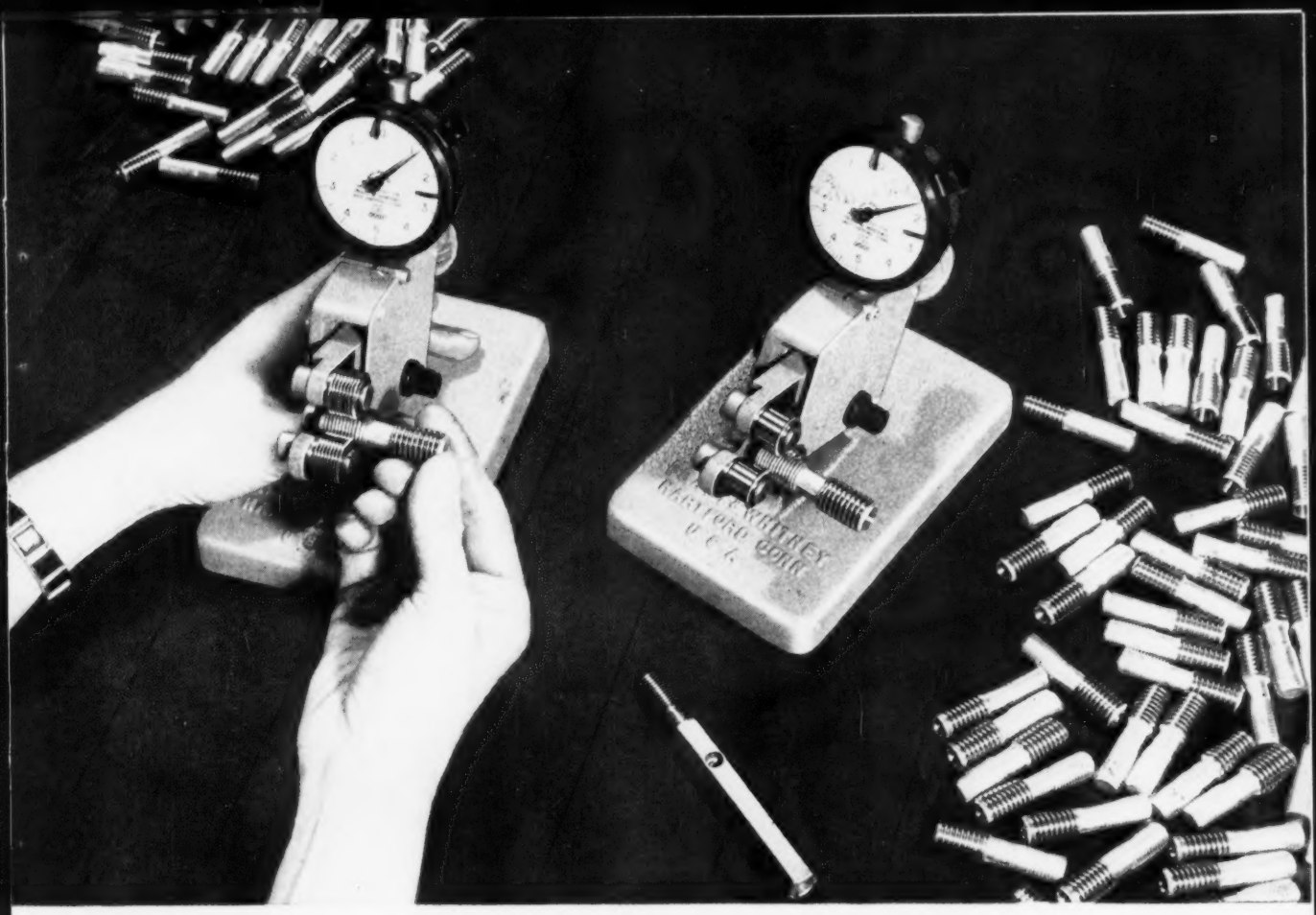
RING-SNAP LIMIT THREAD GAGES

provide a functional check with a "Go" ring at maximum metal limit and an actual pitch diameter check at minimum metal limit with single-rib radius rolls of best wire size.



ROLL THREAD SNAP GAGES

provide a functional check with multiple-rib "Go" rolls at maximum metal limit and a pitch diameter check at minimum metal limit with 2-rib "Not Go" rolls.



CHECK CLASS 3 and 3A THREADS *on a Production Basis*

. . . QUICKLY, DEPENDABLY AND ACCURATELY WITH A P&W TRI-ROLL THREAD COMPARATOR

Here for the first time is a *production gage* that duplicates the precise 3-wire thread measurement method. Equipped with single-rib rolls, the P&W Tri-Roll Thread Comparator provides this *critical check at actual pitch diameter* which is essential in producing threads to meet Class 3 and 3A standards. Equipped with interchangeable full-length rolls, it also provides a *complete functional check* . . . detecting "drunken lead" and deviations in lead, roundness, angle, and pitch diameter.

Today, a greater demand is placed on you for higher precision. A fast-growing percentage of threads must now be produced to meet Class 3 and 3A standards. Be sure your quality control methods are geared to keep pace with this growing demand . . . efficiently and profitably. Write now for complete information on P&W Tri-Roll Thread Comparators.

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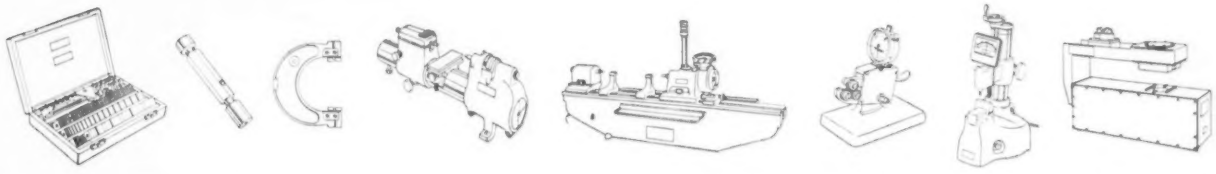

GAGE BLOCKS . . . CONVENTIONAL GAGES . . . SUPERMICROMETERS . . . STANDARD MEASURING MACHINES . . . COMPARATORS . . . AUTOMATION AND CONTINUOUS GAGES

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World's Largest Die

MILLED EASILY, ACCURATELY ON A P&W KELLER MACHINE . . . Consisting of two halves, each weighing 30 tons, this is the world's largest closed die block. Designed to forge aluminum backbones of fuselage and wing structures for the new multi-jet Martin SeaMaster, this giant die was produced by "Kellering" at the U. S. Air Force Heavy Press Plant operated by Aluminum Company of America.

You may not require a 30-ton worksize capacity, but there is a P&W Keller Machine just right for every job requirement . . . ideally suited to handle your dies, molds, prototype work and production milling faster, easier, more profitably.

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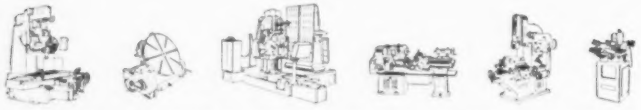


JIG BORERS • ROTARY TABLES • KELLER MACHINES • TOOLROOM LATHES • VERTICAL SHAPERS • CUTTER AND RADIUS GRINDERS

PRATT & WHITNEY

FIRST CHOICE FOR ACCURACY

MACHINE TOOLS • GAGES • CUTTING TOOLS

ity relations section, Foundry Dept., General Electric Co., Schenectady, N. Y.

William M. Haile, elected president, Linde Co., Div. of Union Carbide Corp.

Jess E. Bunch, named manager, Plating Equipment Div., Automotive Rubber Co., Inc., Detroit; **Richard A. Noblett,** named asst. manager.

Dr. James B. Austin, elected vice president, research and technology, U. S. Steel Corp.

Lee S. Wade, named general sales manager, All-State Welding Alloys Co., Inc., White Plains, N. Y.

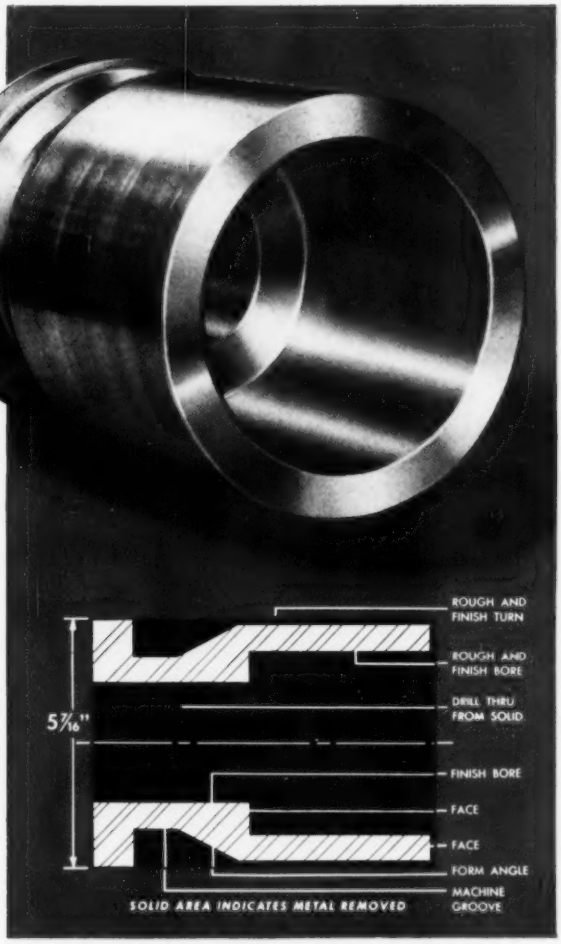
Allan B. Fredhold, Jr., named general manager, General Logistics, Aeroquip subsidiary, Pasadena, Calif.

Joseph L. Miller, named general traffic manager, Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.

M. R. Johnson, named paymaster, Houston plant, Sheffield Div., Armco Steel Corp.

James J. Gilligan, appointed executive asst. to the general manager, Axelson Manufacturing Co., Los Angeles, Div. of U. S. Industries, Inc.

Norman E. Reed, appointed project engineer, Wheeling Steel Corp., Benwood (West Virginia)



Let me show you how one of our P & J Automatics

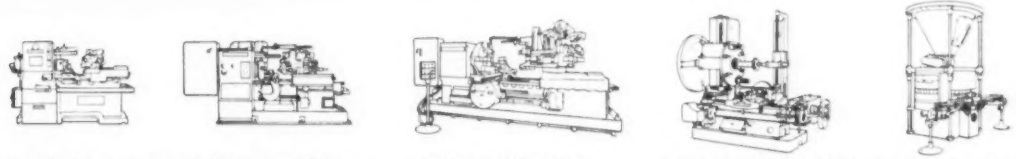
Hogged Out Over

31 POUNDS OF STEEL IN 6¾ MINUTES!

This job looked really tough. Machining from the solid meant unusually heavy metal removal . . . and our customer had to hold some pretty close tolerances and turn out parts *fast*! Here's what did the trick! Our new P&J Automatics have the extra power it takes to hog out metal fast *and* the extra rigidity that's needed to stay within the required limits under the heaviest feeds. You can see how teaming a machine like this with P&J Tooling, to save even more time by combining cuts, made it possible to complete one of these spools every 11 minutes. A new P&J Automatic can bring performance like this into your plant too. Send me your sample prints, and I'll show you how a P&J Automatic with P&J Tooling can help you turn out your toughest jobs faster, better and at lower cost. Write to Potter & Johnston Company, Pawtucket, Rhode Island.

HERE ARE THE FACTS:

PART: *Chuck Operating Spool.*
MATERIAL: *Cut-Off Bar Stock #34 Carbon Steel.*
REQUIRED: *Machine from the solid. Ten separate precision cuts.*
RESULTS: *A part completed every 11 minutes in a single, fully automatic cycle, removing a total of 40 pounds of metal.*
MACHINE: *P & J Model 6DRE-40.*



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POTTER & JOHNSTON
SUBSIDIARY OF PRATT & WHITNEY COMPANY, INC.
PRECISION PRODUCTION TOOLING SINCE 1898

Works; **Newell Dunning,** appointed foreman, construction; **James Kennedy,** named foreman, general labor; **James A. Banister,** named field engineer; **Keith T. Hanlin,** named construction engineer.

Charles R. Wirshing, named metalworking chemicals sales manager, West Coast district, American Chemical Paint Co., Ambler, Pa.

John W. Sticklen, appointed traffic manager, Butler, Pa., Works, Armco Steel Corp.

Alfred J. Sherman, elected vice president, manufacturing, The Monarch Machine Tool Co., Sidney, O.

Homer A. Wilson, appointed division manager, Culvert Div., Republic Steel Corp.; **James Fitzgerald,** named asst. division manager, Canton, O.

L. A. DePolis, named director, sales, Industrial Truck Div., Clark Equipment Co., Battle Creek, Mich.; **Bert E. Phillips,** named sales manager.

John J. Horan, named Eastern division sales representative, Atkins Saw Div., Borg-Warner Corp., Indianapolis.

Rudolf Cerny, named sales engineer, Aerosol Valve, Sun Tube Corp., Hillside and Washington, N. J.

Paul A. Crone, named manager, cold drawn bar sales, The Viking Steel Co., Cleveland.

Dr. Albert Muller, named asst. to the president, Air Reduction Sales Co.

Hugh A. Dovey, named asst. district sales manager, New York sales office, Republic Steel Corp.

Samuel S. Rickley, named Pittsburgh representative, Morgan Construction Co., Worcester, Mass.

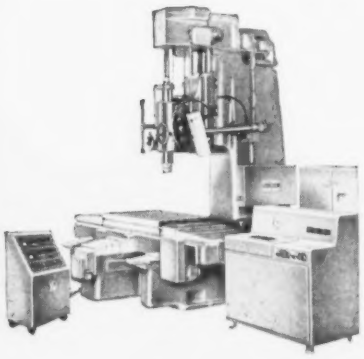
James W. Lowry, appointed district purchasing agent, southern district, Republic Steel Corp.

S. E. Allen, elected vice president and general manager, all company operations, Graver Tank & Mfg. Co., Inc., E. Chicago.

Willard C. Suttles, appointed sales representative, Beardsley & Piper, Div., Pettibone Mulliken Corp.

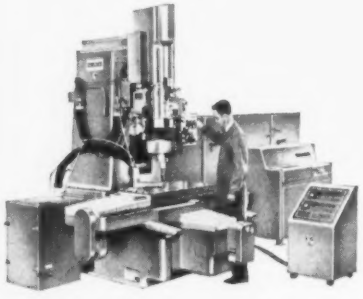
Richard T. Arbuckle, named senior group engineer, airframe equipment, Temco Aircraft Corp.; **Robert S. Anderson,** named senior

PRATT & WHITNEY NUMERICAL CONTROL APPLICATIONS



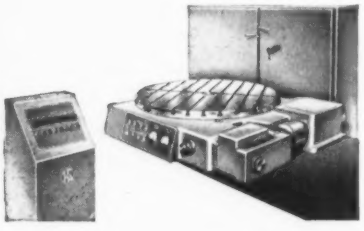
ELECTROLIMIT JIG BORER

Equipped with Numerical Control, the P&W No. 2E Jig Borer is equally suitable for toolroom and precision production applications. Settings accurate to .0001" are made automatically from data supplied by a punched tape or an operator's keyboard.



VERTICAL PRECISION HOLE GRINDER

Table and carriage are similar in design to the No. 2E Jig Borer and the same ultra-precision Electrolimit Measuring System is employed. Column, however, is equipped with interchangeable, turbine-driven grinding heads for spindle speeds to 100,000 rpm.



PRECISION ROTARY TABLES

These Pratt & Whitney Rotary Tables are the ultimate in precision and convenience for circular spacing, graduating and angular positioning. Settings accurate to 5 seconds of arc (2 seconds for repetitive settings) are made automatically from data supplied by punched tape or operator's keyboard.

PRATT & WHITNEY

TO "TENTHS" IN SECONDS

. . . *and no mistakes!*

WITH NEW PRATT & WHITNEY NUMERICAL CONTROL

Operating under Numerical Control, this P&W Precision Hole Grinder is positioned and re-positioned – accurate to .0001" – in an average of only 14 seconds! And since settings are controlled by a punched tape, the chance of work spoilage through operator error in reading blueprint data or setting dials is eliminated. The operator is free to concentrate his attention on work quality.

Applied to Pratt & Whitney Jig Borers, Precision Hole Grinders, Rotary Tables and special machines, Numerical Control not only speeds up toolroom operations, but also makes the high precision of these machines available for efficient short- or long-run production work. In this type work, time savings up to 40% over manual operation are realized. Compare the performance of your present manually-controlled machines with the new standards of speed, accuracy and economy being established by numerically-controlled P&W equipment. If they don't measure up, you are missing important opportunities for improved work quality, larger savings and greater profits.

Write now for complete information.
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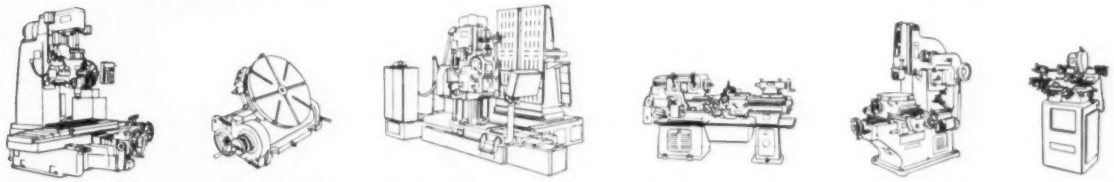

JIG BORERS . . . ROTARY TABLES . . . KELLER MACHINES . . . LATHES . . . VERTICAL SHAPERS . . . CUTTER AND RADIUS GRINDERS

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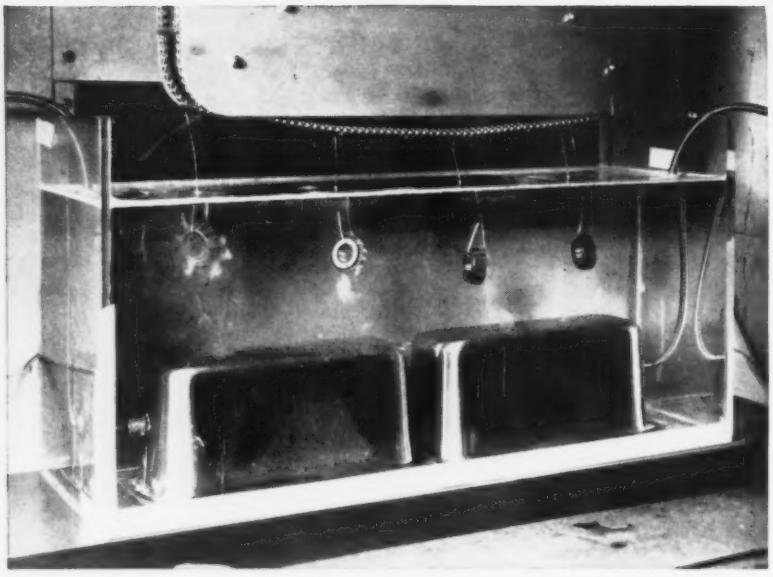


Largest Immersion Equipment for Ultrasonic Cleaning by GU

Lowest cost conveyorized automatic ultrasonic cleaning is now practical with these new General Ultrasonics D-52 immersion Sonicells. Each unit provides a full 52 square inches of radiating area, operating at 20,000 cycles for maximum effectiveness.

The improved, customer-tested, D-52 has all-welded stainless steel construction and an exclusive internal design that results in great ruggedness, high efficiency and long life. Groups of D-52's provide efficient and economical operation in tanks and vats of unlimited volume in all the usual cleaning solutions.

These Sonicells are powered in large installations by exclusive GU motor generators for maximum dependability. Smaller installations are powered by our Model 700 and Model 400 electronic generators designed for continuous operations. All controls are simple and easy to operate.

The increased power of these new units has proved highly successful for the most difficult and largest cleaning operations to remove dirt, buffing, grinding and lapping compounds and also to replace hand cleaning operations on blind surfaces.

For further information or demonstration call or write.

GU **THE GENERAL ULTRASONICS COMPANY**

67 Mulberry Street • Hartford 3, Conn.

THE ULTIMATE IN ULTRASONICS

group engineer, airframes.

John I. Ross, Jr., named sales and engineering representative, central Illinois, Michigan Tool Co., Detroit.

James D. Crum, named sales engineer, Baltimore office, Fulton Sylphon Division, Robertshaw-Fulton Controls Co.

Robert W. Kise, appointed manager, marketing, Industrial Heating Dept., General Electric Co., Shelbyville, Ind.

W. M. Broxham, elected vice president and general manager, Plate & Alloy Products Div., Graver Tank & Mfg. Co., Inc., E. Chicago.

James P. Farrell, named director, sales, General Chemical Div., Allied Chemical & Dye Corp.

Robert Lee Baddorf, appointed chief engineering, Topp Mfg. Co., Los Angeles.

Otto F. Seidenbecker, elected vice president, Manufacturing Div., Northern Indiana Steel Supply Co.

OBITUARIES

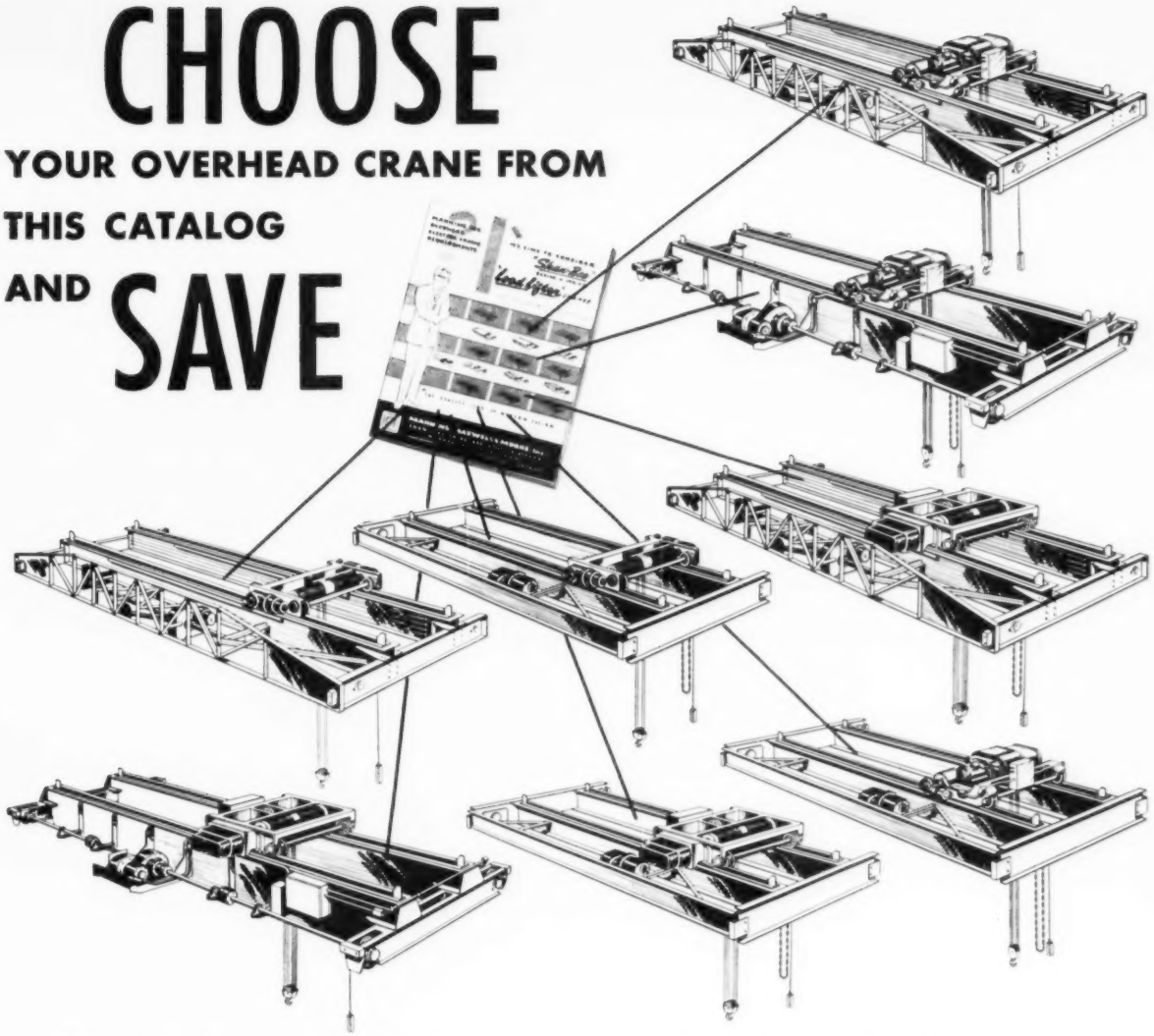
John Jay Hopkins, 63, chairman of the board, General Dynamics Corp.

Fred W. Ames, asst. vice president, U. S. Steel's Consolidated Western Steel Div.

Charles C. Cheyney, 68, vice president, sales, Buffalo Forge Co.

CHOOSE

YOUR OVERHEAD CRANE FROM THIS CATALOG AND SAVE



Now you can have a crane up to 20 tons capacity without getting into extensive engineering. Series "D" 'Load Lifter' Electric Traveling Cranes are so highly standardized you can select from this catalog. You save time and worry and pay less for the crane you want.

Mass production methods are used to build these cranes in capacities from 1 to 20 tons, with spans to 80 feet and with floor or cage control. Even though other cranes for average industrial service cost substantially more, Series "D" Cranes have features found only on the most expensive cranes. Modern construction techniques and components eliminate needless dead weight and drag. An I-beam double girder bridge is provided for spans up to 40 feet. Box-section welded girders give extra rigidity to spans over 40 feet. No whipping or skewing. Other plus values include: maximum use of anti-friction bearings; ball-bearing equipped rotating axles for bridge and trolley wheels; gearing that operates in oil; a double braking system; positive magnetic control; servicing convenience that saves time and money year after year.

The through-and through quality of Series "D" 'Load Lifter' Electric Traveling Cranes combines high performance and low power consumption with complete safety for man, load and crane. Save on initial cost and get the benefit of efficient, economical load handling. Get a catalog and choose a Series "D" 'Load Lifter' Crane in the size, type, trolley style and span you require. *Ask for Catalog 221.*

570-6

MAXWELL MANNING & MOORE INC. M&M TRADE MARK

'Load Lifter'® CRANES

MANNING, MAXWELL & MOORE, INC.

SHAW-BOX CRANE & HOIST DIVISION

382 West Broadway • Muskegon, Michigan

Builders of "SHAW-BOX" and 'LOAD LIFTER' Cranes, 'BUDGIT' and 'LOAD LIFTER' Hoists and other lifting specialties. Other Divisions produce 'ASHCROFT' Gauges, 'HANCOCK' Valves, 'CONSOLIDATED' Safety and Relief Valves, 'AMERICAN' and 'AMERICAN-MICROSEN' Industrial Instruments, and Aircraft Products.

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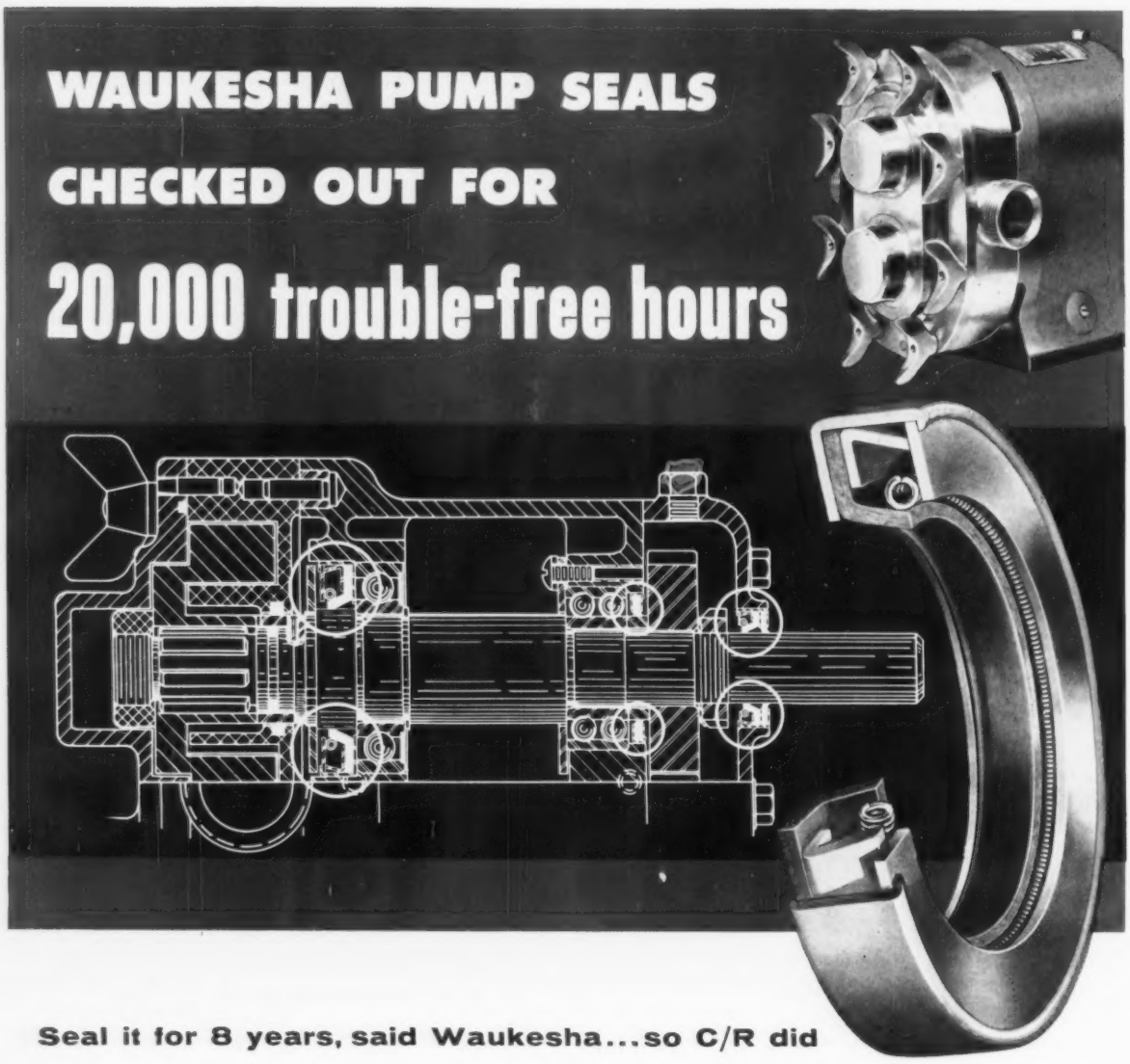

Seal it for 8 years, said Waukesha...so C/R did

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"Cyclosteel": Steel Direct From Ore

By G. K. Bhat—
Staff Metallurgist,
Crucible Steel Research and
Development Laboratory,
Pittsburgh

▪ To the best of our knowledge, this is the first article on the British "Cyclosteel" process made available to the public in the U. S. We feel the article is important to the metalworking industry in general—and to the vast steelmaking industry in particular.

Dr. Bhat obtained all background material for the article at the Iron Making Division of the British Iron and Steel Research Association, Imperial College of Science and Technology, London, England, during a recent visit.

Unlike a number of recent European developments, "Cyclosteel" is not narrowly limited in scope. Its potential is such that you are likely to hear more and more about it in the years to come.—The Editors.

▪ The "Cyclosteel" process is bound to rivet the attention of most American steelmakers. It is that provocative; it is that important.

It's a new, British-developed process for making steel directly from iron ore. Most important, it is a "unitized" approach to steelmaking. As such, it eliminates both sinter plants and coke ovens.

It may prove to be one of the steel industry's major strides since the introduction of the Bessemer process. That is the opinion of Sir Charles Goodeve, director, and his staff at the British Iron and Steel Research Association who developed the new process.

Inverted Answer—Metallurgists and chemists have been trying to improve upon the Bessemer process for a long time. "Cyclosteel" is a likely answer that was arrived at by putting the cart before the horse. It is an instance of "inverted" thinking where mere inversion paid off.

Using the Bessemer process as a guide post, the speed of refining pig iron depends on the dispersion of air bubbles in a liquid metal. If we were to reverse this procedure, molten metal would be dispersed in a suitable gaseous atmosphere. "Cyclosteel" not only reverses the procedure but claims the reversal as its major principle.

Direct Reduction — Specifically, small droplets of incipiently melted ore are dispersed in a high-temperature reducing gas. Reaction of the gas with the tiny droplets (thanks to particle size) is extra-fast. Slag is separated from the metal as a result of gravity, surface tension factors, and a cyclonic centrifugal action. The name "Cyclosteel" derives from the cyclone-like separating action.

What is the present status of "Cyclosteel"? Still in the development stage, the new process has produced test quantities of steel. Current interest stems primarily from the potential it offers—plus the fact that its technical feasibility is no longer in doubt.

Use "Fines"—As a steelmaking process, it appears best suited to the use of ores in a finely divided state. Even the fuel used may be in a powdery form. For these reasons, "Cyclosteel" holds promise of being able to eventually eliminate some of the expensive accessories required in present-day steel plants.

According to E. W. Voice of BISRA, the new process is not likely to replace the blast furnace —not in the foreseeable future, at any rate. To break even with the blast furnace on a competitive basis, "Cyclosteel" has a long way to travel.

U. S. Angle — How long? Ten years of intensive development is the estimate of Sir Charles. Although conservative, this figure may very well apply to the time required for "Cyclosteel" to gain a competitive foothold in the U.S.

In countries where resources for blast furnace operation are unavailable or prohibitively expensive, the new process stands a far better chance of earlier acceptance. In some locations, it may well provide the answer to current iron shortages.

Whole Picture — Just how the "Cyclosteel" process operates is spelled out in the accompanying diagram. Ore is preheated in a

fluidized bed to a temperature just below the point at which it becomes tacky. It is then injected into a reaction chamber filled with reducing gas. The gas is produced by burning any grade of pulverized coal with oxygen.

Inside the reaction chamber, the combination of coal, oxygen, and carbon dioxide produce the reducing gas—carbon monoxide. The carbon monoxide reduces the ore to provide iron and carbon dioxide.

Top Speed — Because the fuel and the ore are introduced in the form of finely divided particles, reaction time is almost instantaneous. Ore reduction is accomplished in a matter of a few seconds.

The combination of cyclonic action and gravity help to separate the precipitated products from the gaseous atmosphere. Final separation of the metal from the slag takes place in the "setting" chamber.

As shown in the diagram, provision is made to cool the reactor casing. A continuous supply of water is circulated through the pipes encircling the reactor casing and the bottom plate.

Chilling of the slag on the inside of the casing affords further protection from intense heat and the abrasion that results from a sliding charge.

Uses Oxygen — For successful operation, "Cyclosteel" uses a great deal of oxygen. As the market for oxygen in steelmaking continues to grow, there should be increasing incentive for producing the gas in large quantities and at lower prices. So that, in the long run, oxygen supply should be no real problem.

Right now the most pressing problem connected with "Cyclosteel" operation centers about suitable pipe materials. Pipes are needed to carry large quantities of hot iron ore into the reactor. They are also used to convey gases laden with liquid droplets of iron from the reactor to the ore heating chamber.

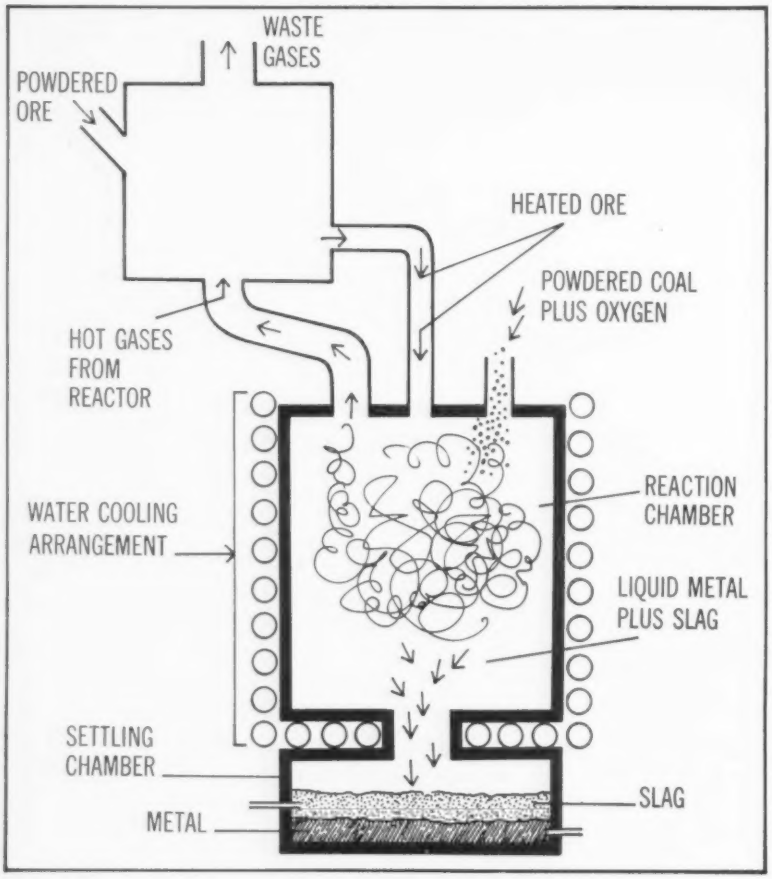
Minor Snags — Maintaining a uniform slag lining on the inside of the reactor casing is another problem. It is not insurmountable by any means. Since it is now possible to check hot spots in the blast furnace lining by means of water-cooling, it is fair to assume that similar protection can be rigged for the reactor casing.

What are "Cyclosteel's" major selling points? For one, it makes direct use of iron ore fines at a time when lump ores are becoming increasingly scarce.

Saves Space — In conventional practice, ore fines are now sintered for use in the blast furnace. The sintering operation involves expensive equipment and considerable capital expenditure. Coke ovens—another "must" in conventional steelmaking—are equally expensive. All of this accessory equipment occupies a lot of costly floor space.

The "Cyclosteel" process solves all of these problems with a "unitized" setup. Also, it is likely that the steel produced by the process will be free of phosphorous. If sulphur tends to run high, lime injection may be tried. Current experiments are restricted to ores of low sulphur content.

The purely metallurgical aspects of "Cyclosteel" have yet to be explored. Most of the research to date has been devoted to learning more about the kinetics of the reduction process. Then will come the problems of making this steelmakers' dream a practical reality.



ALL-IN-ONE: "Cyclosteel" system eliminates sinter plants, coke ovens.

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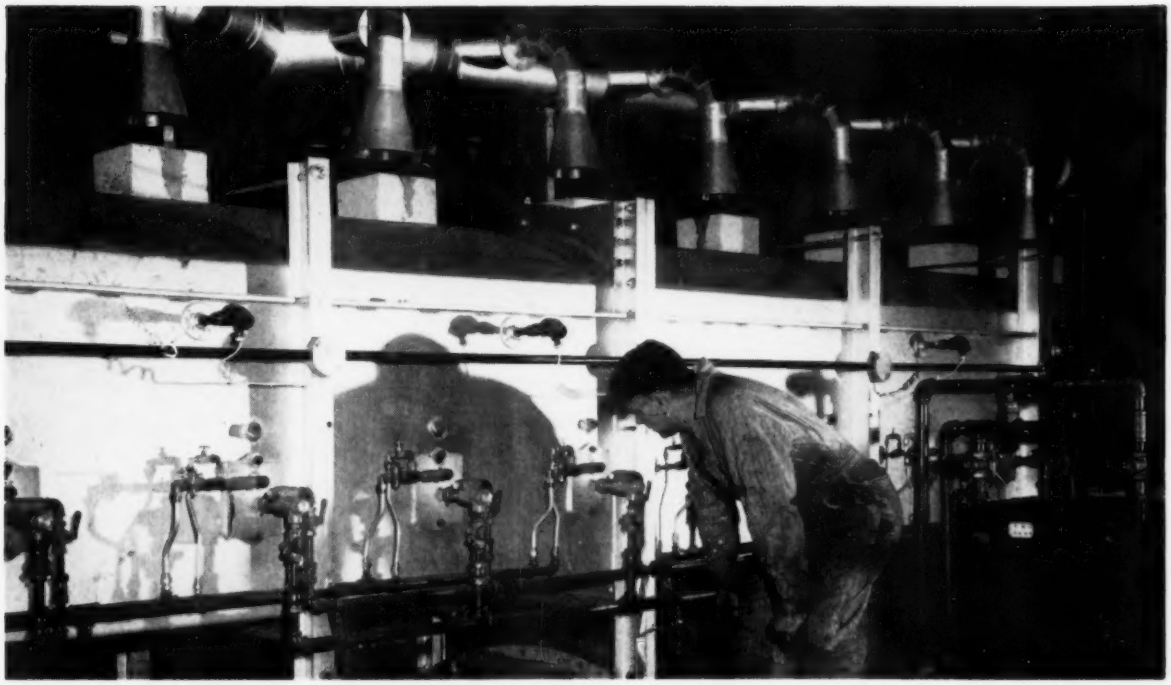


SPECIAL FURNACE: Zircaloy needs frequent anneals, must be annealed in vacuum to prevent gas pickup.

How Tubemakers Work Zircaloy

By **J. S. Rodgers**—Technical Manager,

Wolverine Tube, Div. of Calumet & Hecla, Inc., Detroit

You'll be hearing more about zircaloy as the age of atomics becomes full-blown. It's already finding use on reactors and may turn up in your shop any day.

With it will come problems, many of which have been met and conquered in making tube.

▪ Zirconium and zirconium alloys, commonly called zircaloy, are finding ever-wider use in structural work on nuclear reactors. In addition to adequate strength, zircaloy has low neutron absorption, good corrosion resistance and high melting temperature.

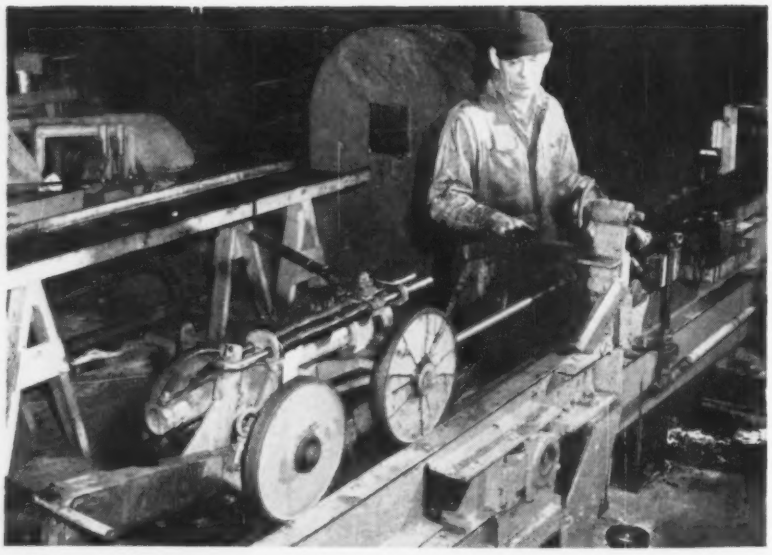
But for the metallurgist and fabricator, zircaloy is a real challenge to engineering skill and ingenuity. Compared with conventional metals, zircaloy is much more difficult to work. It has a hexagonal structure and, like most other metals of this type, has only one slip plane at normal cold-working temperatures.

The alloy work-hardens quite rapidly, which further limits reduction per pass and total reductions between anneals. If the temperature is increased by about 400°F, slip begins to occur along other planes and the metal exhibits a good bit more ductility. An equally rough problem is the fact that heated zirconium is highly gas absorbent—to the extent that its corrosion resistance and other physical and nuclear properties can be drastically impaired.

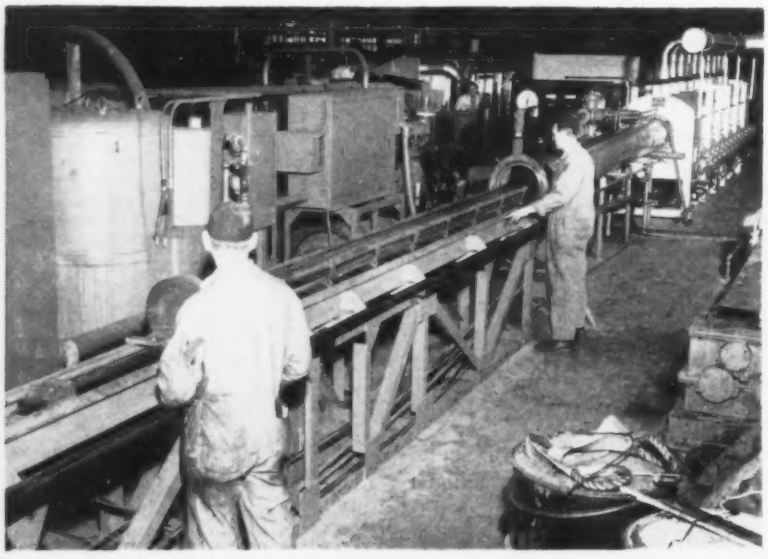
Despite these headaches, zircaloy tube production has now become almost a matter of routine. Standard sizes being made at Wolverine Tube range from 0.25 to 1.00 in. OD, with wall thickness of 0.020 to 0.100 in. Other sizes are made on special order. The experience gained in making rigid-specification tube might help solve related problems in other uses for this unique material.

Before Extruding — Wolverine buys its zircaloy in 1000-lb ingots about 4 ft long and 11½ in. diam, either produced mechanically or fusion conditioned. The ingot is then forged on a 1000-ton hydraulic press to form a billet about 8 ft long and 7¼ in. nominal diameter.

Before preparing the billet for



DRAW BENCH: Special lubricants were developed to hold number of passes to a minimum. Solid mandrel is used for better ID finish.



RAM LOADING: Auxiliary ram pushes basket-load of tubing into cooling section of furnace. A case-history is kept on each batch.

extrusion it's necessary to protect it against gas absorption. This is done by completely jacketing it in a material that has matching extrusion characteristics. Copper and its alloys have proved highly satisfactory for the purpose. A number of other cladding materials can and have been used.

First, the billet is turned down to about 6¾ in. OD; slow, coarse feeds are used to avoid galling and to reduce fire hazard. Tolerances are liberal: around 0.010 to 0.015 in. A hole is then drilled lengthwise through the billet.

To make sure impurities have been removed from the surface, a micro-Kjeldahl analysis for nitrogen is run on the metal turnings. If the tests indicate nitrogen adsorption, additional metal is removed.

Billet Gets Jacket—After the billet has been machined and drilled, a copper alloy jacket is slip-fitted over the outside. A thin tube of the same material goes in the drilled hole. The billet is then totally enclosed by brazing a copper alloy disk to both ends of the jacketing.

Prior to extrusion the encased billet is heated in a rotary gas-fired furnace for 2 to 4 hours at between 1350° and 1500°F. Mechanical tongs convey the heated billet to a 3000-ton Loewy extrusion press where it's extruded under 2500 psi at a controlled rate. The extruded billet varies in length from 25 to 40 ft depending on the specific job.

The resulting tube is cooled for 30 seconds in cold water, then treated with 50 pct nitric acid to remove the copper jacketing. This is followed by a wash in 10 to 30 pct nitric acid.

Reduce and Draw—When the copper has been pickled off, the tubing is sent through a tube reducer, the number of passes depending upon the size tube being made. After reducing the tube is washed, thoroughly cleaned by etching in hydrofluoric acid, and annealed.

Before drawing, the tubing is surface-treated with a phosphate-type coating, which acts to hold the lubricant. Special drawing lubricants have been developed. While they perform satisfactorily, it's hoped that further development in lubricant compounding will permit fewer passes for a given final size.

The current sequence is alternate cycles of cold working, cleaning, annealing and surface treating until the desired size is obtained. Normal tube-producing techniques are employed, with some modifications to suit zircaloy.

Special Furnace Used—Zircaloy being particularly prone to gas absorption when heated, ordinary gas-fired annealing equipment can't be used. A special furnace was built to heat and cool tubing under a vacuum or maximum pressure of one micron.

The heating zone is a 14-in. diam stainless steel retort 23 ft long, which is completely enclosed by a gas fired furnace. A cooling section, also 23 ft long, is bolted to the crucible on the outside of the furnace. It consists of two con-

centric mild steel tubes with an annular space to provide passage for cooling water.

The furnace can operate at 1600°F continuously and 1800°F intermittently. It has 24 aspirator-type burners and 4-zone temperature control, and burns 1000 cu ft of gas per hour to supply a million Btu. A National Research Corp. rotary gas ballast pump, 6 in. diffusion pump, and small holding pump maintain vacuum in both the heating and cooling sections of the retort. Pressure-measuring equipment is a NRC Alphatron and NRC thermocouple gauge.

Rams Handle Load—Tubing is crane-loaded into a basket that travels along guide rails to the entrance of the cooling chamber. In the first step a 3-ft loading ram is mounted on a chain-connected, electrically driven head. The ram pushes the basket into the cooling section, the drive head is returned to the initial position and the ram is removed. The main ram, 25 ft long, is then mounted in place.

On one end of the main ram is a heavy steel plate which gets bolted to the end of the cooling section to completely seal the retort. The ram, which is connected to the basket through a sleeve-and-bearing assembly on the steel plate, transfers the load from the cooling zone to the heating section. At the end of the heating cycle, the ram pulls the load back.

When the tubing has reached ambient temperature, the heavy cover plate is unbolted, the main loading ram is removed and the auxiliary ram is mounted in place. The basket is then withdrawn and the tubing is made ready for the next operation.

Careful Control—To assure dimensional accuracy and good interior surface finish, a solid mandrel is used for the drawing operations. By the time drawing is completed, the zircaloy tube is a tight fit on the mandrel. The first pass through the straightener works it loose.

Testing and inspection are quite detailed. Zircaloy tube production is a batch operation, and each batch is treated as an entity so the customer and fabricator will have a complete history of each lot.

A micro-Kjeldahl test for possible gas pickup is made after each annealing. Visual examination at each fabrication step also plays an important part. A gouge or crack that's hidden in the billet becomes readily visible as the material is drawn to thinner-walled sections.

Dimensional control is important for reactor applications. Finished tubing is completely air-gaged. ID tolerances are closely controlled. Tubes are hydrostatically tested at 500 psi before final examination.

SEALED RETORT: Main ram operates through sleeve in cover plate to move basketful of tubing from cooling section into heating zone.

STRAIGHTENER: By the time drawing is completed, mandrel has become tightly hung up inside the tube. Straightener works it loose.

Diamonds Are Cheap . . . In Machining Glass Cloth Laminates

By R. Thompson—Tool Engineer, Convair, Div. of General Dynamics Corp., Fort Worth, Texas.

Glass cloth laminates are rough on tools. So much so with standard tools that even a small increase in life is a major accomplishment.

Convair had its problems and took a second look at some of them. It's now using diamond tools and finds that they're not too expensive.

▪ Machining glass cloth laminates is difficult. With standard tools, the cutting edges break down rapidly. Frictional galling binds the cutter and the material. Delamination results.

Such was the problem at Convair, Forth Worth, Texas. That is, until the company set up a research program to look into machining methods.

Diamonds The Answer—Abrasive type cutters impregnated with industrial diamonds have come out on top in this program. The diamond cutters have proved most economical.

The continuing research has turned up valuable techniques in machining the laminates, which are reinforced with polyester, phenolic, and epoxy thermosetting plastics.

The problem was created by the abrasive qualities of the glass cloth and resulting dust. To obtain more abrasive resistant cutters, the company tried different materials in each of the several types of cutting edges in use.

Tool Used	Average Consumption	Cost Each	Annual Cost
Star Slitting Cutter	280 per month	.42	1411.20
Hard Chrome Plated Star Slitting Cutter	10 per month	.75	90.00
Diamond Slitting Cutter	**1 per year**	**55.00**	**55.00**
Regular Slow Speed Band Saw Blade	320 per month	1.25	4800.00
Hard Chrome Plated Band Saw Blade	40 per month	1.50	720.00
Diamond 10-in. Diam Cut-Off Saw	**1 per two years**	**195.00**	**97.50**
High-Speed Band Saw Blade	100 per month	3.00	3600.00
Diamond Impregnated High-Speed Band Saw	**1 per year**	**600.00**	**600.00**

First Tungsten Carbide — Research proved that tungsten carbide would outlast high-speed steels in lathe and milling operations. Grinding of the carbide tools was unnecessary because the cutting edge geometry was similar to that for machining steel.

The machine shop used cutting speeds of 8500 to 9000 sfpm. The feed range was from 0.002 to 0.004 in. per revolution. Water and soluble oil were used to cool the tools and wash away the chips. Cutter life was lengthened to ten times that of high-speed steel.

Led To Router Bit—To improve work quality and increase tool life, tungsten carbide was tried in router tool bits. First experiments showed longer tool life, but high rate of delamination.

The best form of router proved to be a solid tungsten carbide burr. This rotary file with ten rasp-cut teeth per square inch was run at 16,000 rpm. The coolant was an air blast to remove the dust and reduce frictional heating.

For some trimming operations a slitting saw is used to cut parallel to the router table. You couldn't use tungsten carbide because of the brittleness of the cutter.

Some promise was shown using copper disks impregnated with tungsten carbide particles.

Hard Chrome Plating — Better results were obtained when ordinary carbon steel slitting saws were hard chrome plated. You got an increase of at least 18 times in tool life. Again 16,000 rpm was used with an air-blast coolant.

Band saws have very short blade life in rough trimming operations. Why not use hard chrome plating here?

The results were gratifying. Band saws which were consuming eight blades per day, now only require one blade per day. Saws were run at 800 fpm without coolant.

The chrome plating was held from 0.0002 to 0.0005 in. thick.

Hard to Hold Size—Drill point geometry showed that you could not drill holes in laminates larger than ¼-in. diam to required tolerances. The company specified that all holes larger than ¼-in. diam be drilled to pilot size. Tungsten carbide counterbores, reamers, or hole saws were successfully used in opening up the holes.

Holes of less than ¼-in. diam were drilled with high-speed twist drills ground to a 90° point. The face of the flute of the lip was ground parallel with the centerline. The scraping action eliminated delamination when the drill broke through. Water and soluble oil fluid were used for cooling and flushing.

Use Diamond Saw—When diamond impregnated tools came into consideration, one such tool was ordered to supplant the slitting saw. This tool has lasted seven months; expected life is a year.

The initial promise of the diamond tool was so good that a 10-in. diam blade was ordered and installed in a tilting arbor table saw. It's good for straight cutting of flat laminates. With saw fixtures, it can be used for detailed trimming.

After four months use, indications are that this diamond impregnated blade will last for about two years.

The speed for the diamond tool has been set at 14,000 sfpm. All feeding is by hand with no coolant necessary.

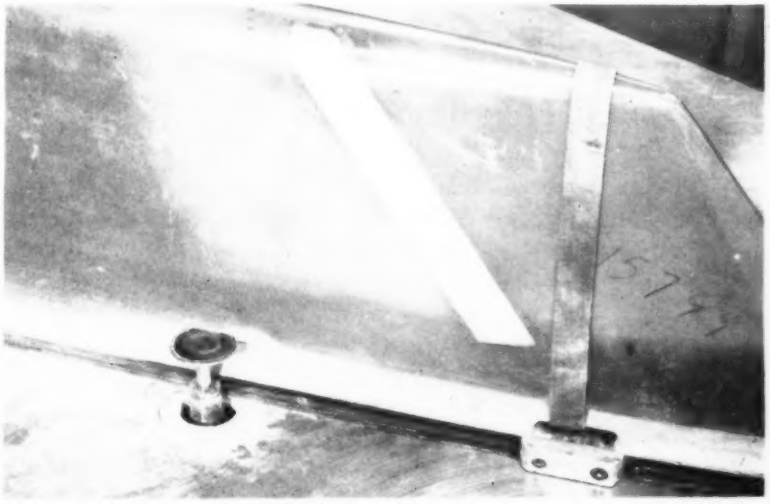
The company is now installing a continuous diamond impregnated band saw blade. Where the 36-in. high-speed band saw has been consuming five blades per day, one diamond blade should last a year.

Parallel evaluations are also being made in the use of the diamond material in counterbores, hole saws and router tool bits.

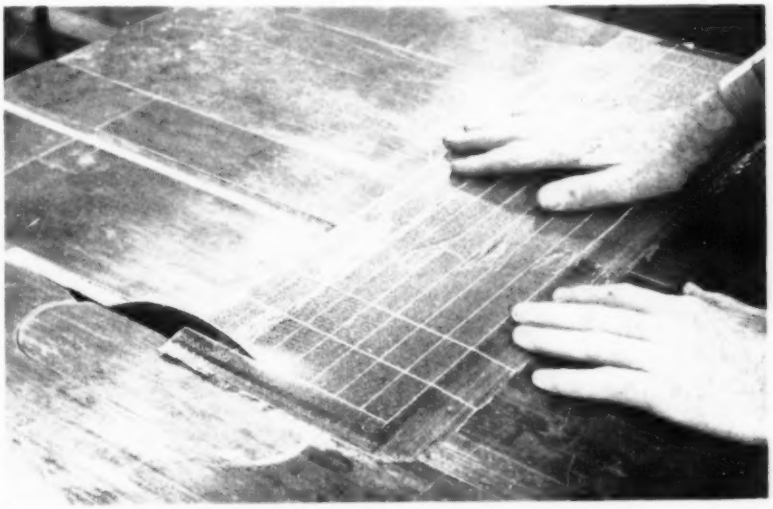
Complete Change—The hope is to eliminate the use of tool steels and tungsten carbides entirely. The table shows the reduction in costs by changing to diamond tooling.

These tools have given other advantages. They cause little or no delamination and reduce burring.

PLATING HELPS: The hard chrome plating extends the tool life of this star cutter.



DIAMOND HOLD UP: Long-lasting diamond impregnated slitting cutter produces a ground finish, cutting down on hand finishing. Tool life is up to a year, and annual savings run into four figures.



LONG LIFE: After four months use, this 10-in. diam blade has a life expectancy of two years. Used in a tilting arbor saw, the blade operates at a speed of 14,000 sfpm, needs no cooling.

BY THE HUNDREDS: Matched pairs of oil pump rotors get their sides honed to parallel surfaces in this machine. Cycle for 20 pairs is 1½ minutes; output is 1500 pairs in an eight-hour day.

Fast Honing Cycles Produce Flat, Parallel Surfaces

By W. G. Patton—Engineering Editor

A little dirt can cause a lot of trouble in an automatic transmission.

The presence of even a bit of lint or a tiny smear of processing compound may make the difference between an acceptable assembly and a reject.

■ Elimination of dirt is one of the reasons why the Microhoning process is applied to four critical parts of Chrysler Corp.'s TorqueFlite automatic transmissions. These units are produced at the firm's new plant in Kokomo, Ind.

There are other reasons besides cleanliness for using the latest flat surface honing machines built by Micromatic Hone Corp., Detroit. Ability of the equipment to produce flat surfaces in large quantities at low cost is essential, of course; such surfaces are needed for bearings or seals.

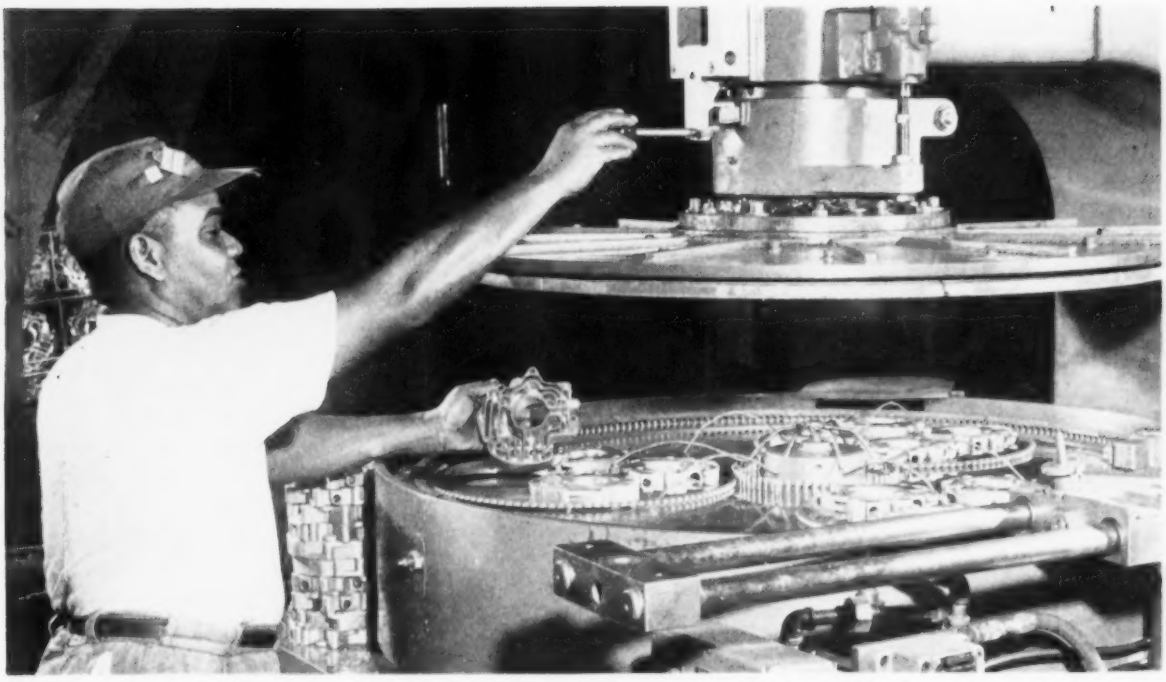
But there are other machine requirements, too, including ability to maintain parallelism, size control and surface finish. The use of automatic feeds is also essential for some parts.

Each One Different—A closer look at several of these transmission parts shows that something different in flat surface honing machines is needed to meet the specific requirements for each job.

Although each part requires flat surface honing, the machine designed to work on any one part has many distinguishing features. These include the method of holding the part, honing action, feeding the part and wheel dressing arrangement. Both single-surface and double-surface honing are used.

An excellent example of precise, double surface honing is the outer and inner pump rotor shown in the accompanying illustration. Previously ground, these parts are then honed in pairs. Matched pairs are manually loaded, 20 pairs at a time.

Short Cycle—Only 1½ min. is required to complete the cycle. During this time about 0.002 in. of metal is removed. Parallelism is held



NO LEAKS ALLOWED: Opposite sides of regulator valve bodies must be honed to "blue block" flatness, inasmuch as final assembly does not permit the use of gaskets or seals. Parallelism is held within 0.0001 in.

to 0.0005 in. and thickness is controlled within 0.0008 in.

For this particular operation, a segmented wheel is used. The wheel is flooded with superfinish coolant which is easily removed during a subsequent washing operation. Finish is held regularly within 20 microinches. This single machine produces over 1500 matching pairs of rotors in an 8 hour day.

Microflat honing of the rear pump rotor for the automatic transmission follows a similar pattern. Again the machine is loaded manually with matching pairs of ground and hardened parts. The fixture for this machine holds 16 pairs.

Two Wheels Used—Prior to honing, a grinding operation, broaching and a Tocco hardening treatment are specified. In this Micromatic machine two solid 21 in. x 1 in. wheels produce a 20 microinch finish. Cycle time is about 1½ min. Surfaces must be parallel within 0.0005 in.

Planet pinions are unusually critical in an automatic transmission. At the Kokomo plant, hardened and tempered gear blanks are fed manually into a Microflat machine. The parts are dropped into a revolving plate that carries them between two abrasive discs.

Workpieces are not clamped or restrained except that their area of travel is limited by the size of the holes in the plate. The motion of the carrier and the path the parts follow distributes the abrading action uniformly across the blanks.

During this operation, which takes about 25 seconds, approximately 0.003 in. of stock is removed. Tolerances must be held within 0.0005 in.

Tight Fit—Chrysler's aluminum valve bodies are an example of parts which, when assembled, must fit together so that no gaskets or seals are required. After assembly, the various valves must take 150 psi pressure without leaking or any binding of moving parts. To obtain such perfect mating, parts must be finished to "blue block" flatness.

A segmented wheel is used to hold parallelism within 0.0001 in. and to produce a 40 microinch finish.

The process of flat surface honing is not unlike the process used so widely for cylindrical surfaces. A combination reciprocation of the parts and rotation of the finishing blocks results in a "Figure 8" abrading pattern. Speeds of the two motions can be adjusted so the abrading pattern is not repeated.

Light pressures are used. In some operations, this pressure is applied through rubber pads. They provide a cushion so stresses are not set up in the part. Rubber also provides a float so the wheel and the work surface can align themselves.

Wheels used vary with the work. Speed of the operation can also be varied in most machines to suit the work and the result desired. A variable speed drive speeds up dressing of the wheel.

Dressing at approximately 45-minute intervals is required to keep the abrasive grit sharp and at maximum honing efficiency. The full surface of a wheel can be dressed in about 5 minutes. Suitable coolwheel flushed clean.
ant jets are provided to keep the

Let Inserts Take The Rub In Die Castings

MOVES FAST: Main crankshaft on this sewing machine travels at more than 5000 rpm. Assembler checks alignment and bearing fits.

Die casting offers many advantages for producing certain parts. But where you need rugged wear, they may fall short.

Steel inserts solve the problem simply. They stand up well at heavy wear points; serve many other uses as well.

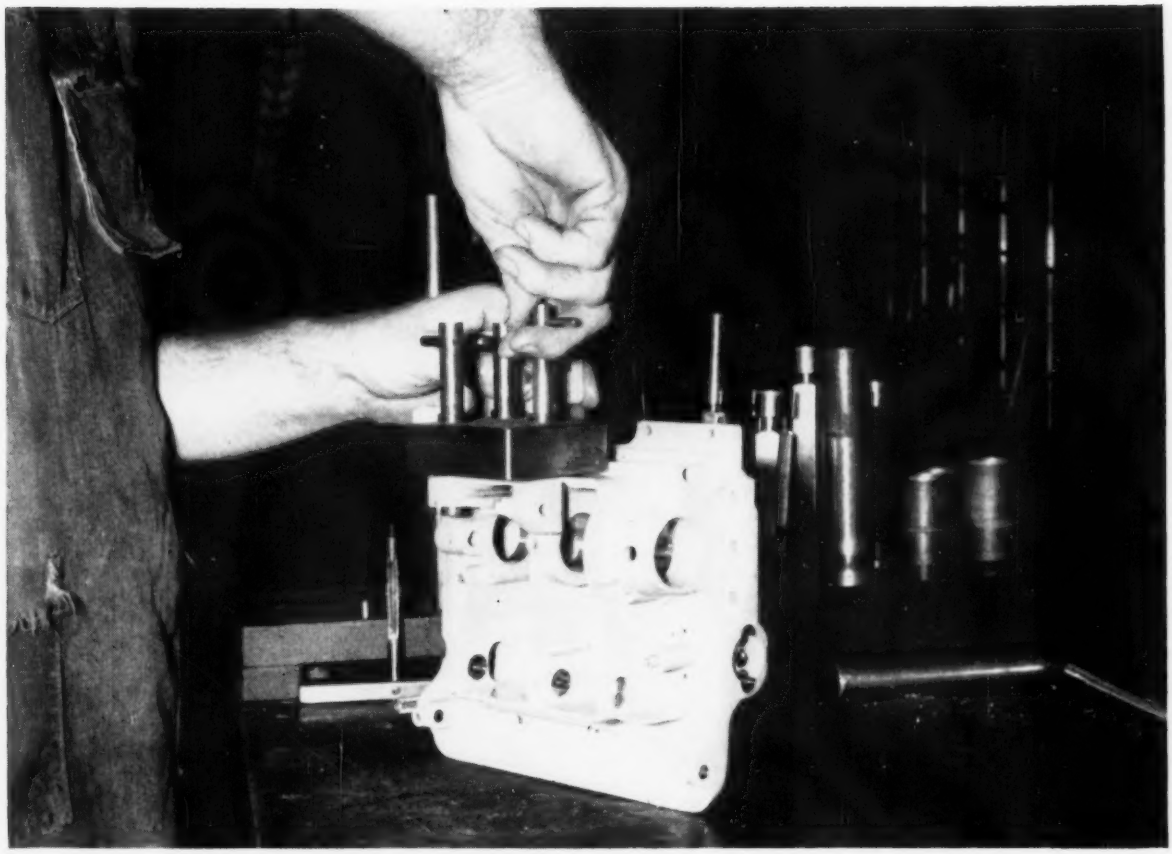
It's a good way, too, of getting curved internal passages that can't be cored.

▪ Let's say die castings appear the best answer to your need for certain machine structural parts. But there are points at which you know they'll fall short—where greater strength, hardness, wear resistance, or improved frictional and magnetic properties are needed. Inserts may then be the answer to the problem.

Or you may want inserts for other reasons. To simplify assembly, for instance. Or to permit part shapes not possible otherwise.

Willcox & Gibbs Sewing Machine Co. had still another reason. For high-speed operation, a system of high-speed forced lubrication through the casting was needed as well. This was solved by an integrally cast copper tubing.

For Rugged Service—The New York firm produces high-speed commercial sewing machines. These are used in making all kinds of wearing apparel. They have to be



TOLERANCE CHECK: Consistent, precision alignment of cast-in holes is one of the main advantages of die casting.

capable of day-in, day-out operation for 15-to-20 year periods in the field. They're constantly serviced to keep them in tip-top operating condition. Moving parts must hold up during continuous operation at high speeds. And adjusting screws and threads must withstand wear under repeated servicing.

All this places stringent requirements on the diecast top frame shown. This has to support the dozens of critical parts involved. It also has to support—without vibration—a mechanism moving at 5500 rpm, with fast starts and stops.

Cooperative Project — Precision Castings Co., Fayetteville, N. Y., division of Harsco Corp., helped W&G engineers lick this one. The two firms have been working together for years to develop die castings for sewing machine parts. The zinc die casting for the top frame shown dates back to 1938. The basic design, for an earlier machine, dates back even further. Yet the revised original dies are being used for the new castings.

The heavy use and rugged wear required considerable servicing of the machines. Sometimes the entire top casting would have to be replaced. This was practically like rebuilding the machine. And repeated servicing often resulted in stripping the threads in some of the holes. Improved castings and stronger threaded holes were needed.

And So, Inserts—The solution to many of these problems was to use steel inserts at the points of extreme wear and where threaded screws require adjustment.

The way it's done now, knurled steel inserts are produced at low cost as screw-machine parts, then are cast in. Eight of these threaded bushings are used in every top casting. A steel bracket and a large double bearing frame constitute two more. The eleventh insert cast into this top frame is a copper tube.

This copper tube is for circulating oil and directing it to the proper outlets—part of the forced lubrication system. In the casting die, this tube fits tightly between small, halfmoon-shaped pegs. These prevent it from moving during die closing and metal ejection.

Sometimes Plated—The inserts used with the top casting are unfinished steel and copper. However, steel inserts are often plated with zinc, nickel or chromium. Inserts for zinc die castings should never be cadmium- or tin-plated. Steel inserts can be cadmium-plated for protection where they are to be cast in aluminum or magnesium.

For use with aluminum, stainless

Inserts can be costly, but you'll often find the advantages gained far outweigh the higher price tag.

steel inserts are recommended where salts and moisture could set up electrolytic action. Other considerations can simplify the designer's task.

A few general tips:

It's sometimes possible to produce large parts where the insert is larger than the cast part itself, with the insert projecting through the parting line of the die. This practice can reduce the size (and cost) of the die required.

Tie It Down—Anchorage is important. This is so in all insert applications, particularly where the insert (such as a stud or handle) is to meet undue stress.

Deep knurling of the insert provides excellent anchorage. But holes, grooves or other undercuts in the insert surface provide still more positive locking. The severity of the various kinds and degree of stress inserts will be up against will often dictate anchorage requirements. Inserts like bearings take only light radial loads. Others are subject to bending, torsion, or to high axial loads.

Another point is that parts with inserts will usually require greater location tolerances that parts cast without them. With an insert, clearance for fitting the inserted piece in the die and the tolerances of the mating surfaces create additional sources of error. Some inserts will fit less snugly than others, and variations in their location will occur.

Reinforcements — Castings for presses, hoists, clamps, shackles and similar types of load-carrying parts can be made more reliable and compact by the use of reinforcing inserts.

Equally common are inserts for bearing purposes. Bronze, brass, cast iron and steel are used in the form of bushings, plates, pins or cups. Porous bronze bearings, oil impregnated after casting, are used where self-lubrication is required.

Sometimes, curved passages inside a casting are required, but are impossible to core. They can be made by inserting bent tubes with sufficient wall thickness to stand the injection pressures.

Insert Sources—Inserts can be cut from bar or tubular stock or they can be stampings or forgings. Talk over tolerances and allowances for movement with the diecaster. It's his job to locate these accurately in the die and at the same time keep flash formation at a minimum. He must also allow for die wear and its effect on insert location.

Overall cost must always be considered when specifying cast-in-place inserts. Precision Castings Co. notes that this includes the cost of the insert itself, plus 10 pct coverage for scrap and costs of the labor for putting inserts in place in the die. An additional cost results from the slower casting production rate necessitated by insert location.

Partially offsetting these are the benefits normally derived from diecastings—advantages which would otherwise be difficult or impossible to obtain. An example cited by W & G engineers is the fact that preparation for painting is much simpler because the original cast surface needs no buffing. The frame gets a single undercoat, then the final finish.

If the balance on adding these up shows the benefits still out-weighing the added costs, the insert's a logical choice.

But Go Slowly—Specify inserts only after careful consideration, so that ease of casting is not impaired and die costs increased disproportionately. And always consult the die caster before final designs are established.

Once you have your die, how much can it take? Well, all the inserts for the casting shown were added by revising the original dies, made back in 1938. Dozens of other changes have also been required, included cast-in ribs and additional reinforcement.

The original dies have held up well even though many changes were accomplished by welding. The welds were machined and polished, leaving no evidence on the casting.

What about die maintenance? The wear of 100,000 castings has required only occasional polishing to clean off scale. Dimensional tolerances vary only a few thousandths.

Up To Eight Cores—The dies contain core pulls on three sides, with additional cores formed on the two die covers. There are as many as eight cores on a single slide. Because the design of this frame casting includes elaborate undercuts, two loose, interlocking pieces have to be inserted in the die, cast in, then later removed from the casting.

WHY W&C LIKES THE DIECAST FRAME WITH INSERTS:

1. The combination gets around wear and lubrication problems.

2. Castings are uniform — important even though the company precision bores many of the main bearing holes in its own shops.

3. Diecastings permit clearance fits impossible with sand castings.

4. Special undercuts required could not be obtained otherwise, even with intricate coring.

5. Smooth-finish castings simplify painting.

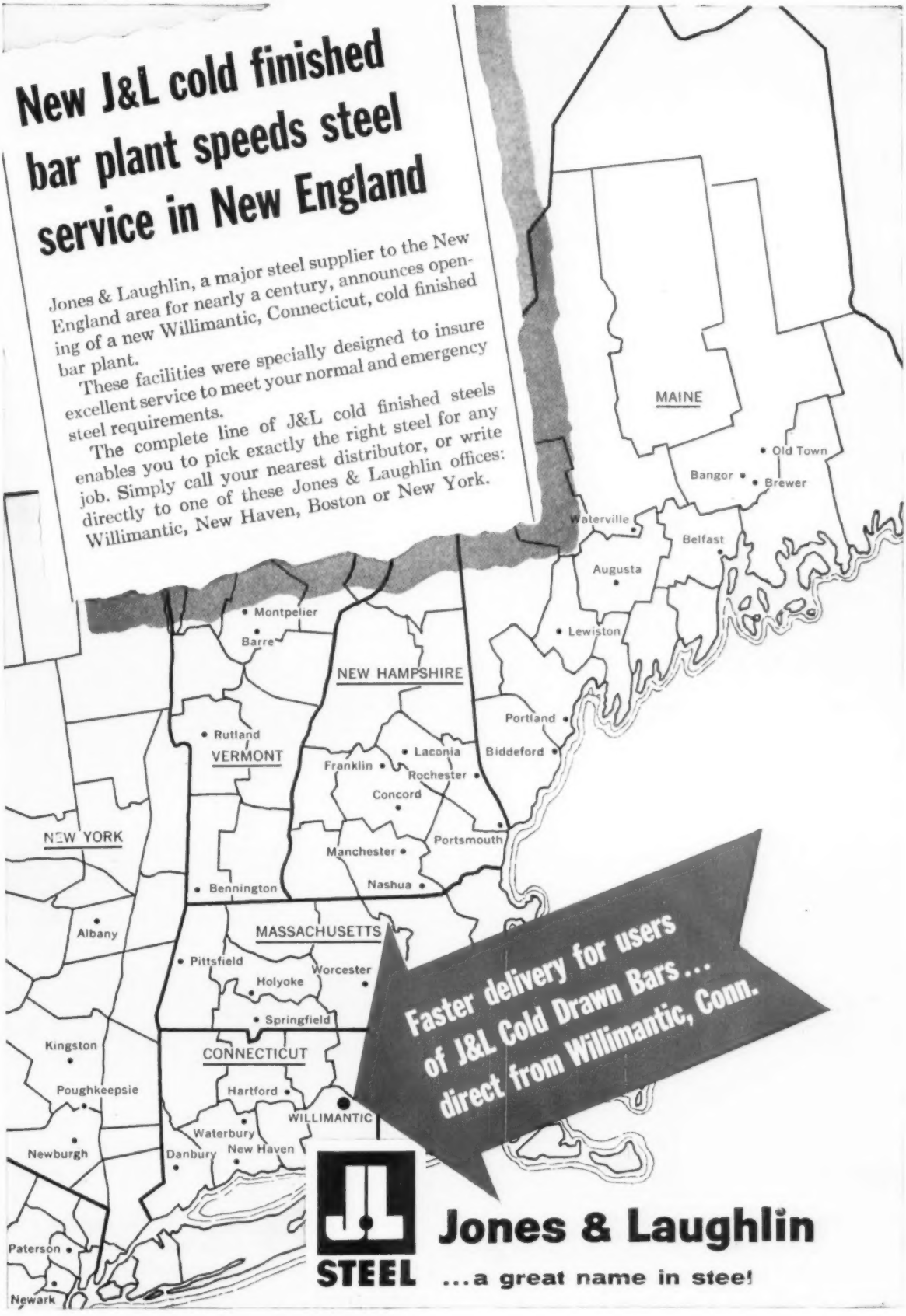
6. Company name or other information can be cast in easily and legibly.

New J&L cold finished bar plant speeds steel service in New England

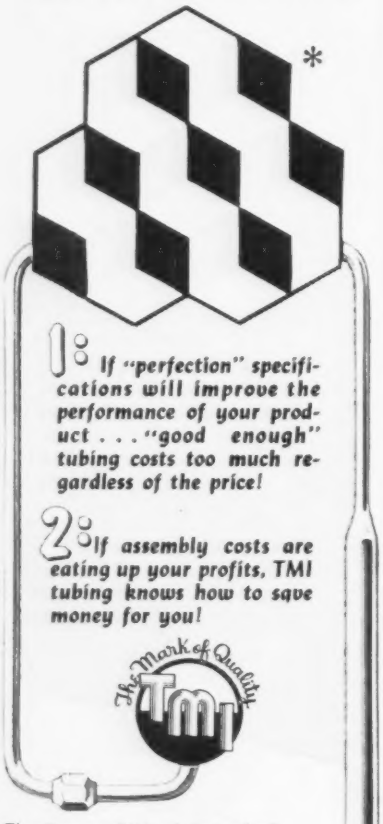
Jones & Laughlin, a major steel supplier to the New England area for nearly a century, announces opening of a new Willimantic, Connecticut, cold finished bar plant.

These facilities were specially designed to insure excellent service to meet your normal and emergency steel requirements.

The complete line of J&L cold finished steels enables you to pick exactly the right steel for any job. Simply call your nearest distributor, or write directly to one of these Jones & Laughlin offices: Willimantic, New Haven, Boston or New York.



IT PAYS TO TAKE A
"Second Look"
AT THE QUALITY IN THE TUBING YOU'RE USING!



1: If "perfection" specifications will improve the performance of your product . . . "good enough" tubing costs too much regardless of the price!

2: If assembly costs are eating up your profits, TMI tubing knows how to save money for you!

The Mark of Quality TMI

The "second" look is typical of alert management and pioneering engineers. They know by experience that "yesterday's" quality standards leave much to be desired. In the small diameter stainles steel and special alloy tubing field, TMI is setting the pace . . . and serving the best. There's a reason!

*six blocks? seven blocks? ...it depends on your point of view.

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MANUFACTURERS • METALLURGISTS • ENGINEERS
SPECIALISTS IN TUBING, .050" to .625" WITH TOLERANCES TO .001" WHEN REQUIRED

Fabricates Cabinets At Rapid Rate

Spending on plant modernization can save money in the long run. Streamlining facilities boosts production considerably.

Following this line of thought, one firm turns out its items at a rapid pace. An air conditioner rolls off the line every 45 seconds.

▪ In producing air conditioners, a fabricator takes sheet and, in minutes, turns it into a completed cabinet.

The cabinet starts out as a single, flat sheet of steel at Westinghouse Electric Corp's brand new East Springfield, Mass. plant. Like every other operation in the ultra-modern factory, the keynote is on speedy assembly. The plant turns out an air conditioning unit every 45 seconds.

Rolling Along—The sheet gets sheared to size. Then units notch and pierce it. It's flange rolled and shaped in a combination tangent bender and welder to form the wrapper, the three sides of the cabinet. The base, which has been previously sheared to size and formed, is placed in the tangent bender and welder. This joins it to the wrapper during the welding cycle. That completes the cabinet fabrication.

Actually, the starting point for all air conditioners at the plant is the steel storage and shear and press area. At this point, sheet steel for the cabinet; the assembly base for the compressor, condenser, and evaporator; the many small parts; and electrical sheet steel for the compressor motor are received. Here, they are inspected and released to manufacturing operations.

Machines Do All — From this point on, machines do everything. They stamp out compressor motor laminations; coat structural sheet with a drawing compound and shear sheets to size. Mechanized units draw, form, trim and notch structural sheet into hundreds of small intricate parts. They blank sides, top and base of the cabinet.

Workers position cabinet bottom in the welder-bender setup.

These are then joined together by welding.

The assembly base for the compressor, condenser and evaporator

Want More Data?

You may secure additional information on any item briefed in this section by using the reply card on page 181. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

is also formed from a flat sheet of steel. After shearing to size, piercing and forming, it's placed in an automatic welder where 15 parts (studs, brackets, T-nuts) are joined to it in one shot.

Cleaning Up — The completed cabinet and assembly base are delivered by conveyor to a washing machine. In the washer, each gets first an alkali wash followed by a double rinse. There follows a rust-proofing and etching so that the paint will adhere better to the surface.

Painting is a combination of dip, flow and spray. All interior parts are given two dip coats while all exterior parts receive a flow coat prime and finish spray coat. All painted parts are moved to the assembly line by an overhead storage type conveyor.

Force Gage Tester Cuts Sample Size

Use of a standard precision force gage in a special but simple test fixture enables one manufacturer to reduce by 50 pct the size of the statistical quality control sample required for testing sewing machine presser feet. Previously the test was performed manually on a "good-or-bad" basis; this relied strictly upon the judgment of the inspector.

Now, Greist Mfg. Co., New Haven, Conn., employs a Hunter mechanical force gage. Using this, the firm is able to set up a test standard, and switch from attributes to variables testing. Thus they can decrease the size of the sample, yet attain great test reliability.

Testing It—The test determines whether or not a certain minimum axial force will dislodge the swivel pin which joins the two other pieces of the presser foot assembly. Fit of the pin is such that it must allow the parts to swivel; yet it has to be tight enough to stay in place during normal operation.

Testers place the presser foot in a fixture beneath the gage's com-

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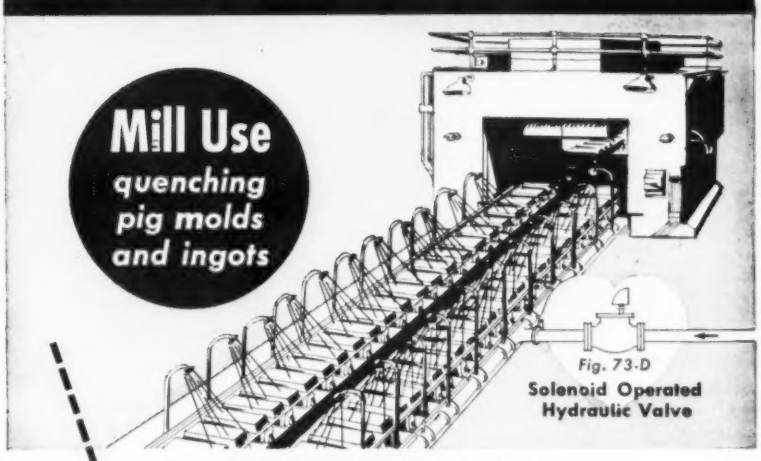


Fig. 73-D
Solenoid Operated Hydraulic Valve

For automatic quenching of pig molds (illustrated above) or ingots, install the G-A Cushioned Solenoid-Operated Valve. This valve opens quickly, closes at adjustable speed without hammer or shock, is available either normally closed or normally open, and is actuated automatically by push button, trip switch on conveyor, or other type of limit switch.

Available in either Angle or Globe Body Pattern

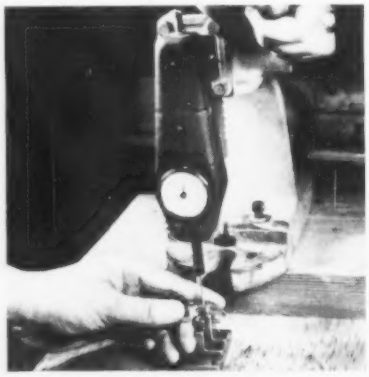
Write for descriptive technical bulletin W-7A.

Golden Anderson Valve Specialty Company
1219 RIDGE AVE., PITTSBURGH 33, PA.

pression head. The gage mounts on a vertical rack. This lowers by depressing a hand lever. A special stiletto, mounted on the threaded stud on the gage head, exerts pressure upon the swivel pin as the gage comes down with the rack. The force applied to the pin is read directly upon the dial of the gage. The pin must not be dislodged by a force of less than 5 lb.

Gage Nomenclature — The gage is one of 18 having overall measurement ranges of 0 to 500 gm to 0 to 200 lb. Hunter Spring Company, Lansdale, Pa., makes them. Like the other 17 force gages, this model has compression and extension heads at opposite ends of its body. Thus, it measures both compression and tension forces directly. Having a factory calibrated, compensated spring mechanism and a fully jewelled dial indicator the model has a 10-lb maximum capacity and an accuracy of ±0.050 lb.

How Foot Works—The presser foot involved in the test is the prime foot of a sewing machine. It holds down cloth passing through the machine. Its two pieces must be held securely together. However, they also must swivel freely during operation. The test determines only the minimum pressure necessary to dislodge the pin since no pressure is excessive if the two parts of the foot swivel freely.



If minimum force dislodges the pin, the assembly is rejected.

Slings Move Big Load With Ease, Safety

Recently, the S. Morgan Smith Co., York, Pa., had a particularly heavy dead-weight load of more than 73 tons to handle. The job of moving this turbine runner after its fabrication called for complete safety of the personnel involved. No physical marking was to be made on the expensive and massive load. Some types of handling equipment would, they figured, leave scars or marks on the machined surfaces.

Meeting all requirements was a multiple wire rope assembly. This performed the assignment without a hitch.

Big Baby—The runner is a prime mover in a new hydroelectric in-

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STAINLESS
• Solid stainless
• Heat resisting
• IngAclad stainless-clad
Ingersoll specializes in stainless steel sheets and plates, and stainless-clad sheets. So whatever your needs, check with Ingersoll first. Here you get not only fine quality, but appreciative service, production schedules tailored to your needs, prompt deliveries, advantageous location. Try us, and see.
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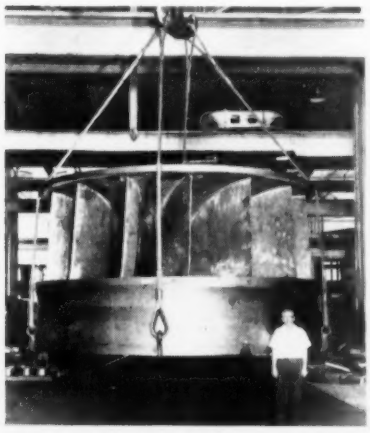
Plant: New Castle, Indiana

stallation. Made from cast steel, it weighs in the neighborhood of 147,000 lb. It's 16 ft 10 in. in diameter and is 7 ft 6 in. high.

With the help of the Wire Rope Sling Dept., American Chain & Cable Company, Inc., Wilkes-Barre, Pa., the company installed a total of four 2-in. cable-laid registered slings.

Get Clean Bill— Each sling has a rated vertical capacity of 45,200 lb. They were proof-tested to 90,400 lb and have a breaking strength of 113 tons. They are fabricated from 2-in. diam cable-laid wire rope with Galacco finish. This is a special galvanized coating which offers high resistance to corrosion. The slings have a Dualoc loop ending on one end, a Dualoc thimble, and an eye hook on the other end.



Wire ropes hold the big runner during the handling operation.

Cable-Laid slings are said to combine the flexibility of manila rope with the strength of steel, offer freedom from crankiness and resistanct to kinking.

Cover Quality Control

Statistical quality controls will be extensively discussed when Washington University presents its third annual course on the subject. It's offered in cooperation with the St. Louis chapters of the American Society for Quality Control, American Institute of Industrial Enginers, and the Society for the Advancement of Management. The dates for the course will be September 5 through 13.

This course is primarily for persons desiring a basic introduction to statistical quality control. Emphasis will be on application rather than fundamental theory, although background material will be presented.

Further information is available from University College, Washington University, St. Louis 5, Mo.

Drill Press Head Speeds Production

Drilling 5 32-in. holes 3/8-in. deep in tough forged rivets is a requirement in one firm's production operations. Former methods produced 125 pieces per hour with very high drill breakage due to the hard stringy metal. How to reduce drill breakage and increase production posed the company a problem.

Continued on Page 148

IN THE SURE HANDS OF EXPERIENCE

In the field of science and industry, theory and academic fundamentals are basic. Equally important is practical knowledge.

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3 MACHINE SIZES

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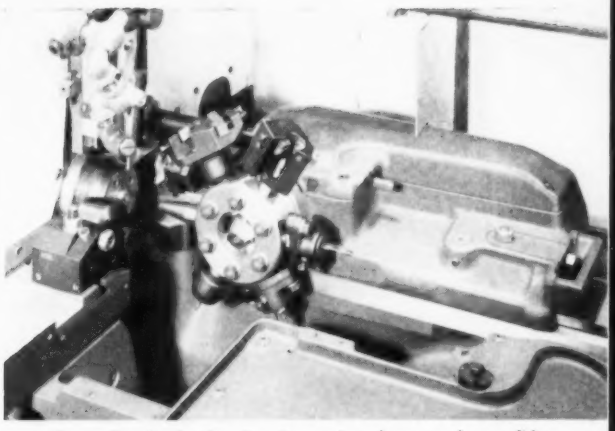
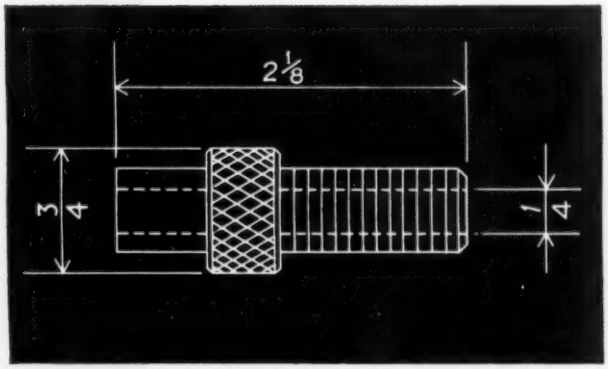


Super-Precise hardened and ground steel ways and cross slides maintain lasting, precise alignment with spindle . . . permit consistent dimensional accuracy to 0.0005" and longer tool life.

Three New No. 2 Automatic Screw Machines

cut production time, boost accuracy on stock up to 1½" diameter



COMPARE PRODUCTION TIME FOR THE ABOVE PART

	Seconds Per Piece	
	Brass	B-1113 Steel
Previous Design Machine	15	120
New No. 2	11	67½

SAVINGS
36% in Brass
76% in Steel

Like the famous Brown & Sharpe "00" introduced two years ago, the new Brown & Sharpe No. 2's now offer accuracy and economy far ahead of any other automatic in their range! Three different machines for ¾", 1¼", or 1½" stock . . . easier set-ups . . . as much as 80% faster production . . . consistently closer tolerances on stock ranging from free machining materials to high alloy steels!

Here are just a few reasons for this super-performance: Spindle speeds up to 20% higher. Turning capacity increased to 3½" length. Exclusive rapid pull-out arrangement is standard equipment . . . keeps drill-end clean and cool, vastly speeds up deep drilling. Full 1" adjustment on turret for convenience of operators and cam designers. Integral vertical slide provides permanent extra tool position. All control by push button. For *better* results on all precision production write for full details on these advanced automatics.
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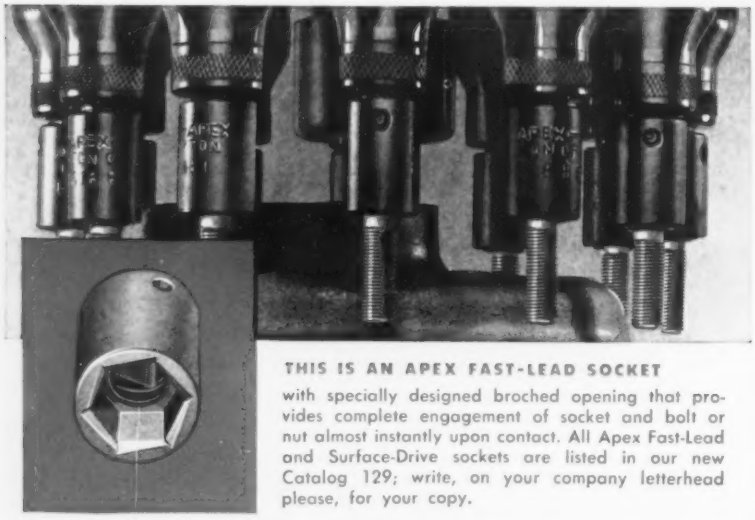
MACHINE TOOL ACCESSORIES • PRECISION TOOLS • PUMPS

In less time than you took to look at these two photos, 12 hex head bolts can be run down snugly and another pump unit assembled. This is modern fastening, using NEW multiple-unit power tools and NEW Apex Fast-Lead Sockets, specifically designed for split-second assembly.



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PHILADELPHIA • PITTSBURGH • PROVIDENCE • ROCKFORD • ST. LOUIS • SEATTLE
SHREVEPORT • SOUTH BEND • SYRACUSE • WICHITA

TECHNICAL BRIEFS

Continued from Page 145

The manufacturer, Bradley Wash-the manufacturer, Bradley Wash-fountain Co., Milwaukee, adopted a special automatic drill unit. With all operating and control mechanisms built-in, this unit was set in place of the standard head on the drill press regularly used for this work. A cycle timer and unloading chute were added to complete the new setup.

Special Unit—A special mounting bracket, an accessory supplied by the equipment maker, secures the new drill head to the standard drill press column. The user reports more accurately controlled precision feeds and speeds are possible with this new drill head. These production results are claimed: (1) no drill breakage, (2) 333 pieces per hour; 2½ times former production, and (3) lower unit cost.

A mount bracket secures the drill head to the press' column.

This drill head is designed for single or multiple operations where frequent changeovers are needed. When desired, it moves quickly, easily from one operation to another with little time loss.

The Dumore Co., Racine, Wis., makes the unit.

Shears Long Pieces

A hydraulic shear 24-ft long is being factory-tested prior to delivery to the new Glenn L. Martin guided

missile plant, Denver, Col. This ¼-in. shear is specially designed for the Martin Co. to handle unusually long pieces of aluminum and stainless steel. The shear's maker is Pacific Industrial Mfg. Co., Oakland, Calif.

Skins Eliminate Many Small Wing Fittings

A fabricator of milled structural components produces integrally-stiffened wing skins for aircraft. These are 0.060-in. skins, with milled doublers around access door ledges.

Design requirements call for rib and spar flange bending material. They also call for carring rib flange loads across spars. Since doublers and skins are machined from one plate, this eliminates hundreds of small fittings normally used to splice rib flanges across spars.

Reduces Weight—By sculpturing these skins and doublers as one integral part from heavy gage skins, the company, Tapered Air Products Corp., Lynwood, Calif., is able to use large skin sizes. For example: the maximum width of sheets from the aluminum producer is 60 in. for sheets of 0.064-in. thick. However, sheets 0.188-in. and thicker are available in widths of 96 in.

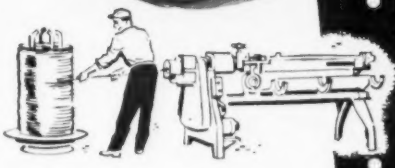
Use of large skins results in eliminating many splices. This reduces weight and improves aerodynamic smoothness. It also reduces assembly time, by minimizing drilling and riveting operations.

Fuel-Tight Riveting—Using skins and doublers as integral parts also produces a satisfactory system for sealing the wing fuel tanks. Extra seams and holes are eliminated. Greater thicknesses permit fuel-tight riveting, too.

The first operation in sculpturing the skins is making outer periphery cuts on the mold line (exterior) side of the raw stock. This is to accommodate mating parts and to cut door frames and recesses. The part is then turned over and, using vertical milling, brought down to finish

WIRE

BACKED BY A HALF CENTURY OF EXPERIENCE



- **Sizes up to 9/16"...** ... down to almost the size of a human hair, in low carbon and medium low carbon steels.
- **Wire of many finishes** the right wire for the job—coppered, tinned, bright, galvanized and other finishes to fit your production needs.
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ECONO-COIL—Reduces scrap loss up to 90 percent. Saves material handling time. The Econo-Coil gives you continuous length wire coils of 2000# to 3000# catchweight, in sizes from 12 gage through ½" diameter. Shipped on returnable Econo-Coil pallets.

LEVERPAK—Mechanizes your wire handling, protects wire against moisture, dirt and handling damage. LEVERPAK permits long uninterrupted runs of 500# to 650#, depending on wire sizes. Saves scrap, downtime, stores easily.

SPECIAL SHAPES—D-shaped, V-shaped, oval, half-oval, half-round, square, rectangular, triangular, keystone-shaped and others. Saves fabricating and machining costs.

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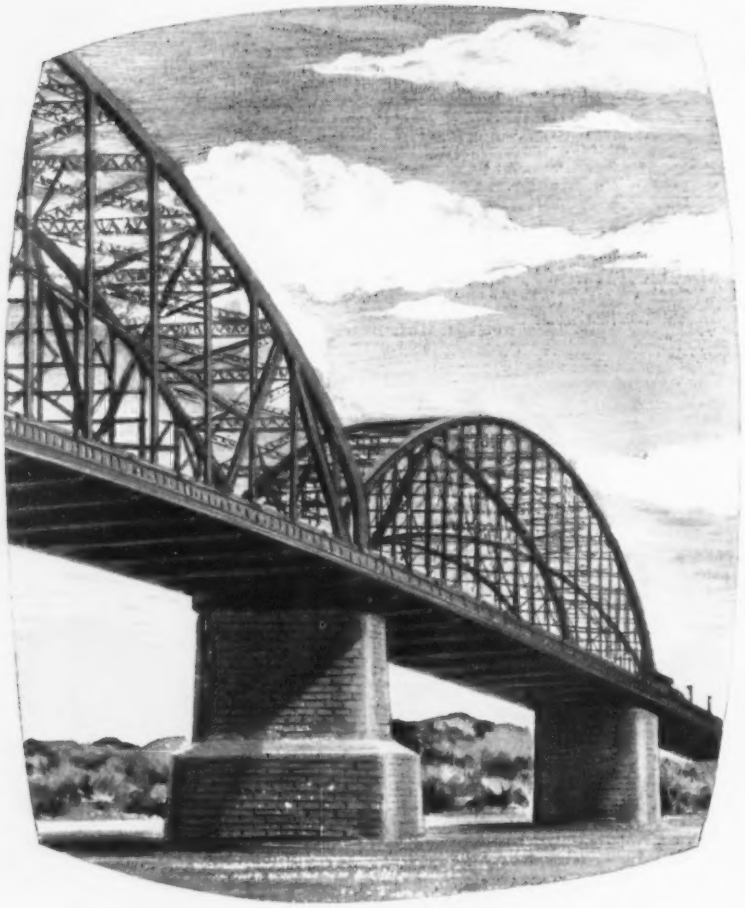
PRODUCERS OF Manufacturer's Wire in many sizes, tempers, and finishes, including Galvanized, KOKOTE, Flame-Sealed, Coppered, Tinned, Annealed, Liquor Finished, Bright, and special shaped wire. Also Welded Wire Reinforcing Fabric, Nails, Continental Chain Link Fence, and other products.



ONLY STEEL . . .

can provide the basic structural strength to withstand the tremendous stresses, strains, and loads of a modern "bay-spanning" bridge!

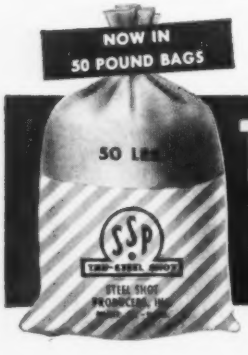
ONLY STEEL . . .

can do the job where the prerequisite quality in an abrasive calls for steel's hardness, toughness, and strength.

"TRU-STEEL" is TRUE STEEL

The original high carbon, fully heat-treated steel shot of tool steel quality. TRU-STEEL is solid, hard, and tough — TRUE STEEL in Chemistry, Characteristics and Performance.

NOW IN 50 POUND BAGS



Write for full information on TRU-STEEL and what it can do for YOU in YOUR cleaning operation!

TRU-STEEL SHOT

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Butler, Pa.
Subsidiary of Pittsburgh Crushed Steel Co.
Pittsburgh 1, Pa.

Sold by Pangborn Corporation, and by leading distributors of foundry supplies from coast to coast

dimensions, cutting pockets and details.

Hand Finishing—Machined skins then undergo hand finishing. Here all milling cutter marks are blended from the part and all radii smoothed. This assures a clean surface to avoid cracking and stress raisers. Since some of these parts become the airplane's integral fuel tanks they must be completely free of residue and metallic particles.

The firm puts the skins through a rigid inspection procedure, using check tables, overlay templates and gages. Inspection by company inspectors is continuous throughout the fabrication process.

Custom-Tailored — The manufacturer's machines are specifically tailored for fabrication of integrally stiffened sheets and structural members. They are modified or designed to the firm's own specifications. Horizontal skin mills with a table 103-in. wide x 56-ft long and vertical skin mills with tables 54-in. x

Skilled craftsmen hand-finish the skin surfaces.

43-ft are equipped with special hydraulic control cylinders to assure smooth control. The hydraulic tracer controls the vertical rise and fall cutting action for variations in web thicknesses as the machine moves in the longitudinal cutting plane.

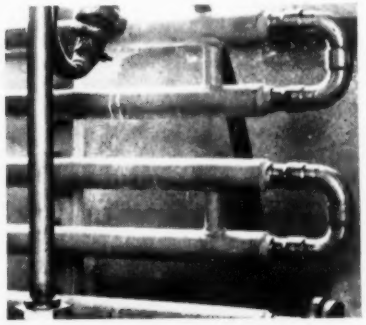
The firm produces as many as

500 machined skins in a single production order, varying in thickness from 0.072-in. to 0.015-in., widths ranging from 14-in. to 103-in.

Stainless, Fittings Halt Pipe Leaks

Leakage in its process lines doesn't bother one firm, because there isn't any. Stainless steel and special connections make sure of this.

Not only doesn't American Alcolac Corp. have to worry about leaks, but they've saved money by using these fittings. Stainless steel



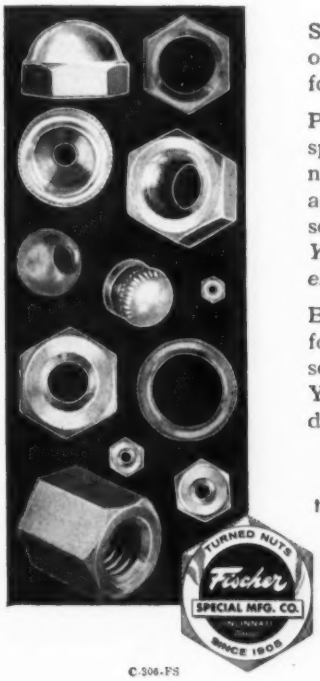
Neat and tight; that's these special pipe connections.

is necessary, of course, because materials flowing through the lines are of a high degree of purity. Some hard-to-handle solvents probably would have leaked through the joints if they were threaded. So states the company.

Lightweight Champ — Schedule 5 pipe is used throughout. This is because its wall thickness is quite adequate to handle the pressures involved. Equally important, material savings are substantial over conventional Schedule 40 pipe. Reducing wall thickness cuts weights, hence costs drop. Moreover, lighter pipe is easier to handle.

Much of the piping is installed in an inflammable area and welding inside the building isn't safe. Many of the connections were heliarc welded before the new plant went into operation; any necessary future welding though,

Fischer hatches "specials" every day!



Special and odd size nuts . . . brass or aluminum . . . are "duck soup" for Fischer.

Precision-turned on unique high-speed machinery, Fischer nuts set new standards of uniformity and accuracy that will speed your assembly operations . . . and cut costs. *Yet you pay no more for Fischer's extra quality!*

Before you place your next order for brass or aluminum "specials", send your specifications to Fischer. You will receive prompt price and delivery quotations.

there's no premium for precision with

Fischer

FISCHER SPECIAL MFG. CO.

445 Morgan St. • Cincinnati 6, Ohio

C-306-FS

must be done outside the area; then the entire assembly must be installed in some other fashion. These connections are flanged.

Speedline Fittings—The bulk of the connections are made with stainless steel Speedline fittings. This type fitting reduces installation time and costs substantially. The range of fittings includes, aligning connectors, "ells", "tees", and reducers from 4-in. down to ¾-in.

Since welding cannot be used to repair the line or to make changes in it, a most important further advantage of the fittings is the adaptability of their design. In order to make any future repairs or changes entire sections will have to be removed and taken from the building and then put back into place after the work has been done. The unions permit this because they can be loosened and resecured.

H. T. Potts Co., Philadelphia supplies the fittings.

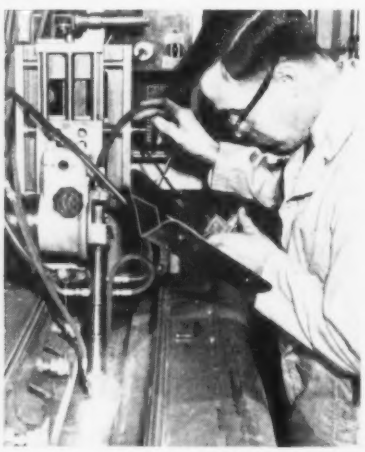
Cuts Weld Preparation And Finishing

Preparation and finishing are practically eliminated in making seam welds on feed oil reservoirs at Grumman Aircraft Engineering Corp., Bethpage, L. I., N. Y.

Using automatic inert arc equipment, the firm also joins aluminum nose cones to fuel tanks.

Seam Weld Trio—In making the oil reservoirs, company welding engineers explain that the oil tank requires two seam welds about 21-in. long. Its baffle takes one seam weld, approximately 13-in. long.

Material used on the job is 6061-S-051-diameter aluminum, with



Operator watches as the automatic inert arc setup does welding.

43S filler wire of the same type. Using argon gas, the ampere setting is 85-amp with a speed of 50-ipm.

The company employs automatic Fillerarc equipment supplied by General Electric Co., Schenectady, N. Y.

Study Vacuum Metals

Vacuum metallurgy will be discussed in 26 university lectures beginning June 10. The program

From first heat to heat treat . . .

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designs and builds them better

COVER TYPE
ANNEALING FURNACES

DIRECT-FIRED SINGLE-STACK
Generally Recommended
for
Greater Productivity per Investment Dollar
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When warranted by special conditions, radiant tube or multiple stack construction are also available.

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MEMO TO: *You*

YOU MIGHT AS WELL try to count the beans in a carload as the number of parts that are made of Roebling High Carbon Specialties, Flat Wire and Spring Steel. These Roebling products are unsurpassed for mechanical and dimensional uniformity . . . for speeding manufacturers' production and cutting costs.

Next time you order cold rolled high carbon wire or spring steel specify Roebling. Strictly on its performance you'll probably become a steady customer from then on. John A. Roebling's Sons Corporation, Trenton 2, N. J.

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Subsidiary of The Colorado Fuel and Iron Corporation

ATLANTA, 934 AVON AVE. • BOSTON, 31 SLEEPER ST. & 5 PITTSBURGH ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 2340 DIENDALE-MILFORD RD., EVENDALE • CLEVELAND, 13425 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • ROCHESTER, 1 FLINT ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • ST. LOUIS, 3001 DELMAR BLVD. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, 19 RECTOR ST., NEW YORK 6, N.Y.

"You sure this Chlorothene solvent is safe, Chet?"

"Sure, Jess, it's as safe as they make 'em. Of course you don't drink Chlorothene® or swim in it. You use good common sense in handling any solvent."

"Tell me more. Will it catch fire?"

"No, unlike petroleum solvents, it has no flash or fire point. We use a lot of Chlorothene for cold cleaning, wiping and dipping because it's the safest solvent we can buy."

"Is the toxic hazard from breathing vapors very high?"

"It's one of the safest. Has an M.A.C. rating of 500 ppm. In fact, our Safety Engineer recommended it."

"Guess that takes care of the safety angle."

"Yes, and Chlorothene really takes care of the cleaning angle, too. It's high in solvent power and evaporates fast."

"Say, Chet, did you invent this stuff?"

"Nope. Dow developed it."

"Who?"

"Dow. The Dow Chemical Company, Midland, Michigan. You know, the company that makes the complete line of chlorinated solvents—Dow Trichloroethylene and Dow Perchloroethylene Industrial for vapor degreasing, and Dow Methylene Chloride for stripping and cleaning metals. Why don't you write them for the whole story?"

YOU CAN DEPEND ON DOW

will last one week. Further information is available from Dr. R. F. Bunshah, New York University College of Engineering, University Heights 53, N. Y.

Inclusions Hold Key To Vacuum Melts

After a satisfactory non-destructive testing method for inclusions is found, we'll learn a lot more about vacuum melted steels. That's the conclusion of a discussion group on the subject.

Meeting in Detroit, members of a Society of Automotive Engineers, Passenger Car Body & Materials panel extensively discussed the behavior and properties of vacuum melted steels and alloys. They studied the effect of vacuum melting on spring steels, bearing steels, valve and stainless steels, low alloy steels and super-alloys.

Look Alikes — One paper reviewed reported that there's little difference between vacuum-melted and air-melted SAE 1060 when the two materials are tested in rotary bending. Later, it was disclosed that all bars thus tested were shot peened prior to checking. This appeared to show, as did other research, that the number and type of inclusions may be the key to developing steels with superior fatigue properties.

Another report described research work involving more than 250 bearings made from 52100 steels. This pointed out that vacuum melting is a promising approach to the development of better quality steels for bearings.

All Suspects—An additional review brought out that all types of inclusions are "suspect" in bearing failures. Some grades, particularly steels and alloys containing high Mn and high Si, seem to be more susceptible than other grades. Still another paper indicated that both the presence of inclusions and high N content may be factors in fatigue failures.

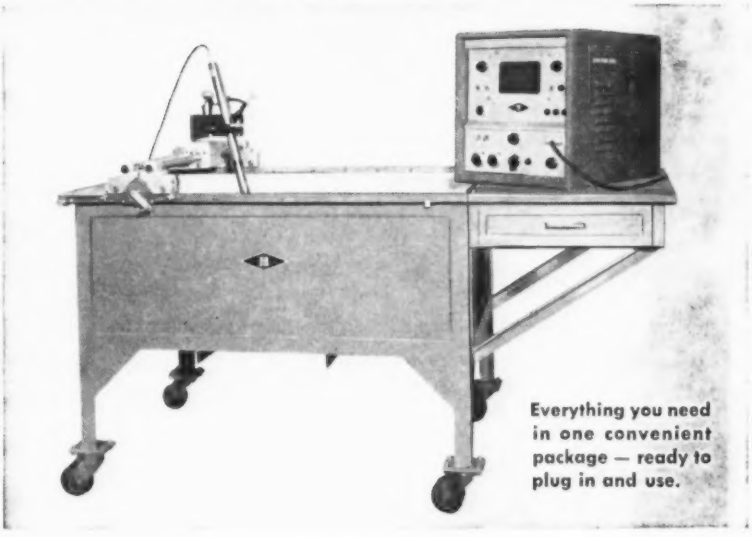
Vacuum melted steel compositions may have better forming properties than air melted alloys as well as improved resistance to corrosion, particularly where low alloy compositions are concerned. So states another paper. Improved ductility and better resistance to fatigue and impact failures were indicated, it stated.

Dead-End — Discussions of vacuum melting benefits on spring steels were inclusive. These pointed out that the presence of and the persistence of skin imperfections in wire may be a more important consideration than potential benefits from vacuum melting.

Superalloys containing Al and Ti are particularly benefitted by vacuum melting, it was shown.

Sponsored by the Engineering Materials Activity of SAE, participants included representatives of: Ford Motor Co., New Departure Div., General Motors Corp.,

ULTRASONIC INSPECTION



COMPLETE, THRIFTY PACKAGE for immersed nondestructive testing

Now Curtiss-Wright offers all the benefits of immersion ultrasonic testing of metal without the expense of an assembly of several costly separate units. This new low cost "package" combines in a self-contained single unit the Immerscope — the heart of the system — a four-foot tank, search tube and rack, precision manual manipulator, longitudinal and transverse manual scanning mechanism and a complement of crystals. Here is a complete immersion testing, quality control installation ready to operate, whether in laboratory or light production — a system that can be readily expanded, with only minor investment, for more demanding production applications.

The technique is simple. Metal parts are immersed in water. Ultrasound is applied to penetrate the metal. Defects present will reflect the sound. Those echoes are presented as pips on the cathode ray tube of the Immerscope. Flaw detection is precise and positive.

Complete information on request. Our local representative is available to discuss your problem.

INDUSTRIAL AND SCIENTIFIC PRODUCTS DIVISION
CURTISS-WRIGHT
CORPORATION • CALDWELL, N. J.

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Why NEW "150" HYDROHONER

Is Economical . . . Compact . . . Standardized

Basic Micromatic "150" Machine, suitable for both internal and external Microhoning.

Now, even manufacturers with limited capital can afford Microhoning . . . with all its benefits including efficient stock removal, accurate geometry and controlled surface finish. The new Micromatic "150" Hydrohoner is the answer!

Because it is standardized and produced in quantity, this quality machine is economical. (Special engineering is limited to tooling and fixturing.) The design and quality of the "150" assures performance equal to more expensive honing machines. It has a 12" stroke and Microhones diameters up to 1½" . . . yet requires just 34" x 52" of floor space.

The Micromatic "150" is ideal for the manufacturer with limited capital, short production runs or a need for standby equipment. Immediate delivery from stock on basic machines.

The principles and application of Microhoning are explained in a 30-minute, 16mm, sound movie, "Progress in Precision" . . . available at your request.

☐ Please send me "Progress in Precision" in time for showing on _____ (date).
☐ Please have a Micromatic Field Engineer call.
☐ Please send Microhoning literature and case histories.

NAME _____
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MICROMATIC HONE CORP.
8100 SCHOOLCRAFT AVENUE • DETROIT 38, MICHIGAN

TECHNICAL BRIEFS

Thompson Products, Inc., Vacuum Metals Corp., Universal Cyclops Corp., General Electric Corp., Allegheny Ludlum Steel Corp., and Haynes Stellite Co.

Drills 800 Precision Holes in Dieholder

More than 800 holes get drilled in an 11-ft long die holder. For use in a new automated production line, the 3-in. thick fabrication is worked on a precision optical jig borer.

In the production of adjustable shelving at Standard Pressed Steel Co., Jenkintown, Pa., the die holder accommodates 188 piercing dies. A

Worker gages one of the hundreds of holes in the dieholder.

mating tool holder of similar proportions contains the piercing tools that will punch the 188 holes into pressed steel shelving uprights. Some of these are round, some oval, some rectangular. The operation is all done in one stroke of a 1000-ton press.

First Stop — The tool and die holder set will be the first station in a four-stage, automatic transfer die. All-in-all, some 8 tons of tooling will pierce and completely form finished uprights up to 10-ft 3-in. long. Probably the major advantage of the all-in-one tool and die holders will be the precision in hole

alignment. This insures free and easy fit of shelves at positions up and down the shelving frame.

The jig borer used in the hole drilling operation spots holes in dies to within 0.025-in. in a 6-ft length.

All Lined-Up—The problem of aligning several separate die sections is eliminated. One die set pierces the holes in any size upright that the company makes. These come from 3 ft 3-in. to 10 ft 3-in. in height. Also, two smaller uprights (i.e.: 4 ft 3-in., 5 ft 3-in.) can be pierced simultaneously.

Fax Speeds Orders

An interstate facsimile communications network now handles sales and production orders for a major metals producer.

Using the transmission setup is Reynolds Metals Co. It makes use of alternate voice - and - facsimile transmission over the same circuit. Western Union and American Telephone and Telegraph Co. are its developers. The system links New York, Boston, Hartford, and Newark.

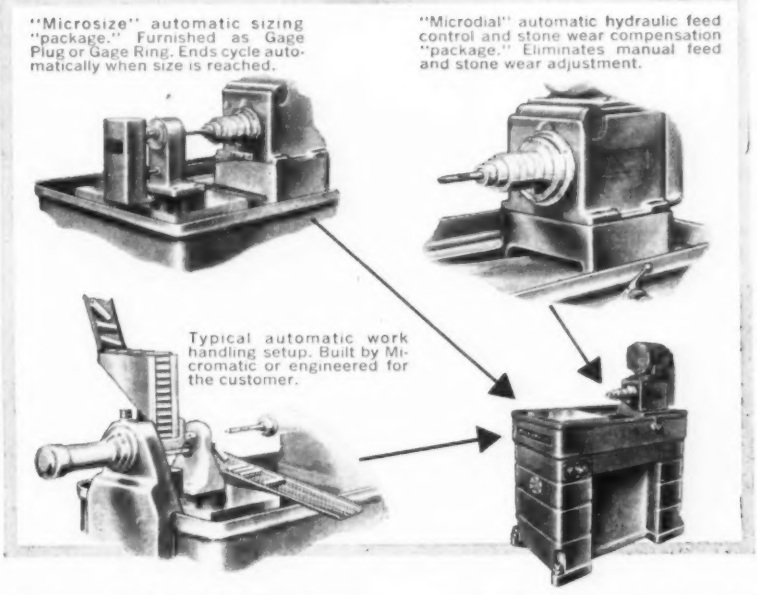
The company's order system, of which facsimile is the initial step, begins with sales writing a production order. They simultaneously transmit this to the production control offices and to the plant shipping offices. Shipping details are later wired from plants to sales offices to provide current information to customers.

Steam-cleans Parts

Steam cleaning removes dirt, grease and oil from parts at Warner & Swasey Co., Cleveland. The manufacturer uses this method for cleaning machined parts for its turret lathes, automatics and Gradalls.

Doing the job for the company is a high pressure combination cleaner. Installed three years ago, the firm finds it highly successful for removing layout markings, machining oils, chips, etc. The unit

How NEW "150" HYDROHONER Can Be Automated to Any Degree . . . Easily . . . Economically


"Microsize" automatic sizing "package." Furnished as Gage Plug or Gage Ring. Ends cycle automatically when size is reached.
"Microdial" automatic hydraulic feed control and stone wear compensation "package." Eliminates manual feed and stone wear adjustment.
Typical automatic work handling setup. Built by Micromatic or engineered for the customer.

The basic Model "150" Hydrohoner is a new, standardized and economical Microhoning machine . . . priced for manufacturers with limited capital or relatively short production runs.

The basic machine features automatic stroking and hydraulic initial tool expansion and collapse. Various degrees of automation can be easily added at any time to the basic machine as required by individual manufacturers' needs. Micromatic "package units" which provide specific automation functions are illustrated. Design of this basic horizontal machine and its stationary bridge facilitate addition of these "package units". For complete automation of the "150" Hydrohoner, Micromatic will build automatic work handling devices or assist users in designing their own automation of work handling.

Send coupon for complete information.

Learn how Microhoning will give efficient stock removal, closer tolerances, accurate alignment and functional surfaces.

☐ Please have a Micromatic Field Engineer call.
☐ Please send Micromatic literature and case histories.

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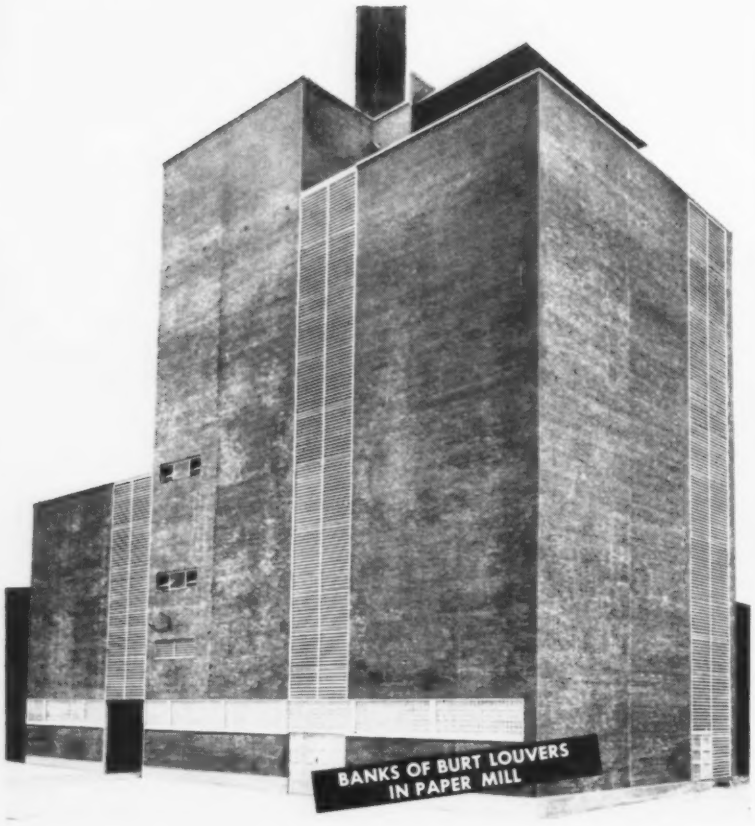
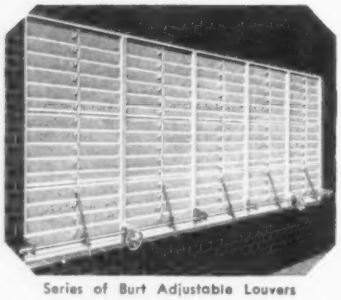


BURT LOUVERS ARE VITAL VENTILATING EQUIPMENT

Air removed from a building with gravity or fan ventilators *must* be replaced. Burt Wall Louvers, with fixed or adjustable blades, provide efficient, weatherproof air inlets. The Burt line is complete, from general purpose models to industrial types and includes removable screens, louver operators and other accessories. Burt experience and specialized equipment also provide every facility to economically construct special units when required.



Series of Burt Adjustable Louvers

Send for **FREE** *Data Book!*

Write for Burt Data Book SPV-17. It supplies quick data on Burt's complete line of modern Wall Louvers

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The Burt Manufacturing Company

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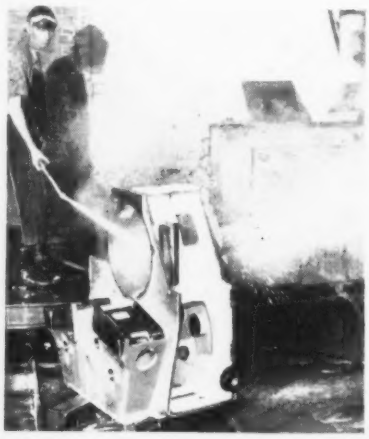
MEMBER POWER FAN MANUFACTURERS ASSOCIATION

operates 20 hours per day, 6 days a week.

Another One—A second steam unit cleans castings and performs maintenance cleaning at the firm's Gradall plant.



Steam cleaning removes oil, chips from machine part.

Warner & Swasey spokesmen point out that extremely close tolerances demanded of the machine parts in many cases make it essential that they be absolutely clean.

Teams Two Machines

Combining two pieces of machinery enables a small tool job shop to do both production and experimental work on the same unit. It involves coupling a Howe and Fant turret drilling attachment to a Bridgeport miller. This results in a very flexible tooling unit.

Used by Ray Johnson Associates, Greenwich, Conn., the small firm makes precision parts for Microphase Corp., an electronics company. This company requires that Johnson continually manufacture the parts on an experimental run basis, involving as few as ten units. Once, however, a design has been approved, production of from 300 to 900 units is required.

Wide Range—Despite this range

in work, he is able to handle both types profitably. The turret drilling attachment is the answer. In addition to its normal work, the miller with the attachment is capable of precision drilling, reaming, tapping and counter-boring. All this is done with the same spindle, without removing the work from the fixture until a given hole is finished.

The aluminum parts required by Microphase often consist of six or more holes in a straight line pattern with as many different diameters. It is necessary to hold space tolerances to ±0.001-in. from hole center to hole center. The combination of the turret drilling attachment and the miller permit this accuracy.

Speeds Output—Output of these pieces is up more than three times that previously obtainable. Without the attachment, it would be necessary to change the tool for each operation on each hole.

With the turret attachment, the six different stations on the turret head enable the operator to line up the work under the spindle and keep it there until all operations on one hole have been completed. These include drilling, reaming, counter - boring or tapping, as needed.

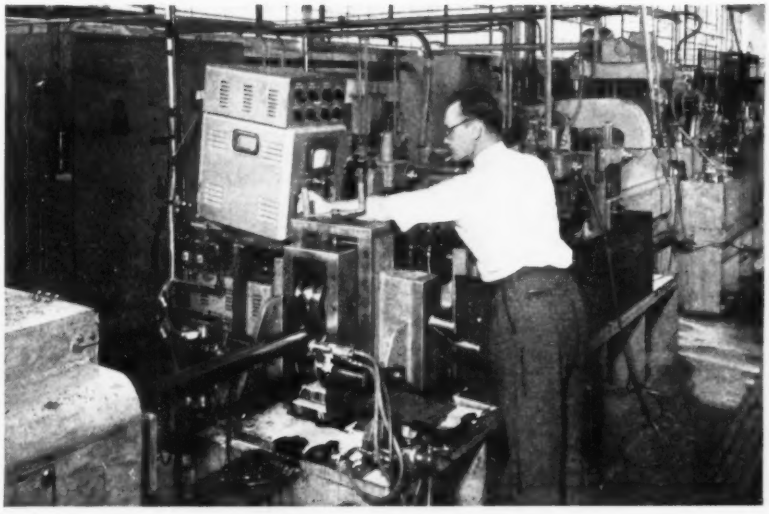
Fixtures Raise Cost—Alignment accuracy of the work and the spindle plus the rigidity afforded the work by the work-holding fixture do away with a need for jigs specially built to hold the work. If jigs were required, the entire operation of both production and experimental work would be economically impossible, Johnson points out.

A change of tooling can be effected in just a few minutes. Even an apprentice machine operator can run production once the tool has been set up.

Diagnosis Motors

Engineers at a large motor production plant use an instrument very like a physician's stethoscope in their inspection work. They use

AUTOMATIC WELD INSPECTION ON CONTINUOUS PRODUCTION LINE



Continuous inspection of welded steel tubing at production speeds is now an accomplished fact with the Sperry Ultrasonic Reflectoscope® and RA attachment. This unit scans material traveling at high speeds and monitors the quality of the weld. Far more thorough than the human eye, it provides a record of the weld quality and signals when the quality of the weld falls below a predetermined level. Designed to incorporate alarm systems as well as automatic marking devices, the Sperry Reflectoscope and RA attachment is a flexible, accurate instrument which opens a new area to more effective cost-cutting quality control.

To keep posted on latest developments in the profitable use of ultrasonic inspection by industry, send for your copy of our new Ultrasonic Inspection News Letter.

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FIRST IN ULTRASONIC INSPECTION

clear the air for production

Dust produced by grinding, chipping and similar operations is removed as created by down draft dust control systems, pioneered by Kirk & Blum.

Whatever your problem in industrial dust control, call on Kirk & Blum, an organization of engineers and mechanics with 50 years' experience in this specialized field.

Write for complete information.
The Kirk & Blum Manufacturing Co.,
3200 Forrer Street, Cincinnati 9, Ohio

KIRK & BLUM DOWN DRAFT DUST CONTROL

the devices to actually listen to the heart-beat of complex gear motors.

When automatic testing equipment rejects a gear-motor at General Electric's Gear Motor & Transmission Components Dept., Paterson, N. J., quality control men get out the instrument to give the unit a second chance. Only the trained human ear, the firm contends, can accurately diagnose some

Using the stethoscope, a tester "listens" to the motors.

imperfections. These must be eliminated to restore it to first-class operation, under the company's rigid specifications.

Wire Reel Throwaway

For generations, fine wire has been wound on heavy reels to withstand winding pressures and rough handling. High freight costs of shipping thousands of reels back and forth between mill and processor generally has been considered a necessary evil of the business.

Several wire mills, however, didn't like this shipping expense. So they called in a reel manufacturer to help eliminate it. At this point, there was much skepticism that it would ever be solved.

Change-of-pace — Acrometal Products, Inc., Minneapolis tackled

the problem. At first, it seemed improbable to answer. Then the firm's engineers decided to take a totally fresh approach. They began

The wire reel handles easily; is disposable after use.

to think in terms of a disposal reel.

After extensive research, the company came up with a reinforced fiber products reel strong enough to handle the job. Yet, this reel is cheap enough to throw away after use. It may also be burned up when empty.

Automation Breeds New "Watchdogs"

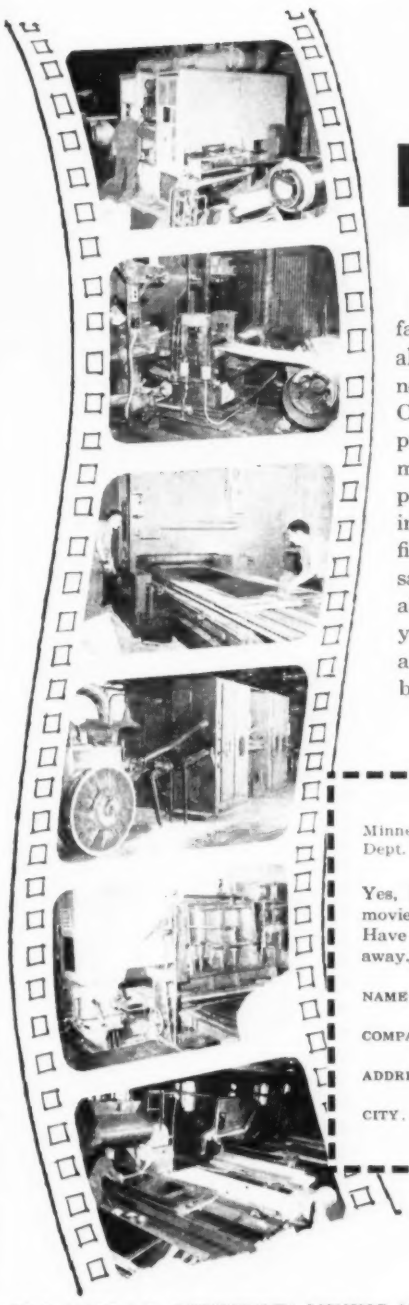
Automation is breeding a new brand of industrial "animal." These are efficiency "watchdogs" which check machine time cycles and performance. And more of them are vitally needed to make automation work with maximum effectiveness. So states K. E. Birrell of the Sheffield Corp., Dayton, Ohio.

Speaking before the Machine Tool Electrification Forum, the project engineer points out that automatic "time study" must be widely applied to check performance of machine tools. Old eye and stopwatch procedures of time study are no longer accurate or fast enough for many automatic machine tools, transfer mechanisms and cycling and assembly machinery, he declares.

Answer Makes Question — The

Announcing an important new motion picture for

Primary Metal Industries



If you manufacture, process or fabricate *any* of the primary metals, you'll want to see the brand new full-color sound movie, "A CHALLENGE FOR STEEL", prepared especially for the primary metals industry by the 3M Company—world's largest producer of industrial coated abrasives. You'll find this movie packed with cost-saving tips, helpful information about coated abrasives. Contact your 3M Representative today for a free showing. Or send coupon below.

Minnesota Mining and Manufacturing Co.
Dept. DD-57, St. Paul 6, Minnesota

Yes, I want to see your primary metal movie "A CHALLENGE FOR STEEL". Have a 3M Representative contact me right away.

NAME.....TITLE.....

COMPANY.....

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3M COMPANY

problem of making the human element more efficient has been largely eliminated by automated processing. However, industry now must see to it that automatic machinery also is operating at its highest efficiency.

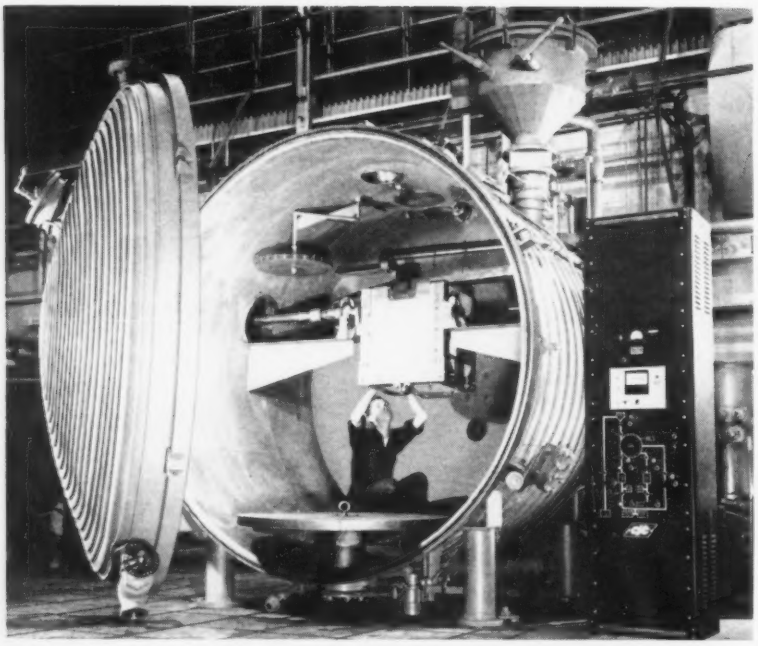
This job is being tackled by automatic machine efficiency "watchdogs." These are not canines but super timing, cycle-recording and cycle-control devices. They supersede the eyeball and stopwatch methods of timing automated machinery.

Sample Unit—One such new device is made by the engineer's firm. Called the "Monitorecord," it is now being widely applied to time and control automatic machinery performance beyond the capabilities of human obsrvation. The instrument is about the size of a portable radio. It can be used to measure the timing and cycle performance of a single machine tool; or it will measure and record the speed and quantitative performance of a complete production line.

Spots Pinholes

Capable of spotting holes down to 1-mil diam in opaque strip steel measuring 0.010-in., or less in this pinhole detector. The device functions at maximum sensitivity at strip

Strip speeds by at 2000-fpm as the detector "passes" on it.



CEC's new 300 to 1000 pound vacuum induction melting furnace.

Get a vacuum furnace that *grows* with your needs

Save costly alterations, or the purchase of another furnace, when your requirements change. Make sure you get these features:

Flexible capacity. Expand the furnace's basic 300-pound capacity to as much as 1000 pounds simply by changing the crucible-coil.

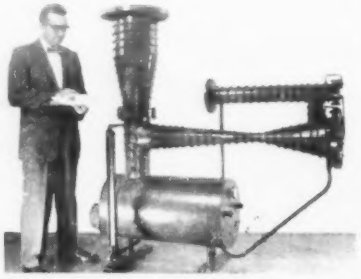
Add an interlock valve to the charging assembly and process as much as 3000 pounds of metal without breaking vacuum.

Flexible pumping system. Add a pump, or switch to larger pumps, and double, triple, even quadruple the pumping system's speed and capacity.

Flexible casting. Cast a single large mold or many small ones; add such accessories as arc hot-topping equipment in ports already provided.

Flexible accessories. All necessary accommodations for a sampler, immersion thermocouple, optical sight tube, vacuum throttling valve, interlock valve for charge addition, or any other accessories you want to add.

For more details on this flexible CEC induction melting furnace send for Bulletin 4-35.



Pumping systems are interchangeable: 1 or 2 KS-2000 (shown here), 1 or 2 KS-4000, or one KS-16,000.

CEC

Consolidated Electrodynamics
Rochester Division, Rochester 3, N. Y.
formerly Consolidated Vacuum

OFFICES IN PRINCIPAL CITIES THROUGHOUT THE WORLD

speeds to 2000-fpm. A new 2500-w mercury vapor lamp provides 20 times more light than the maker's earlier units. This lamp operates on direct current to eliminate "dead bands" in the strip.

Engineers say the increased lamp wattage makes possible greater sensitivity in detecting angular as well as vertical holes.

The pinhole detector can be supplied with versatile, factory-built shutters. These "float" on a cushion of compressed air surrounding the strip edge while tool-steel rollers guide the steel through the unit. Shutter openings range from 18 to 48-in. wide. The unit uses six photomultiplier tubes. A burnout relay sounds an alarm in case of lamp failure.

General Electric Co.'s Specialty Controls Dept., Schenectady, makes the unit.

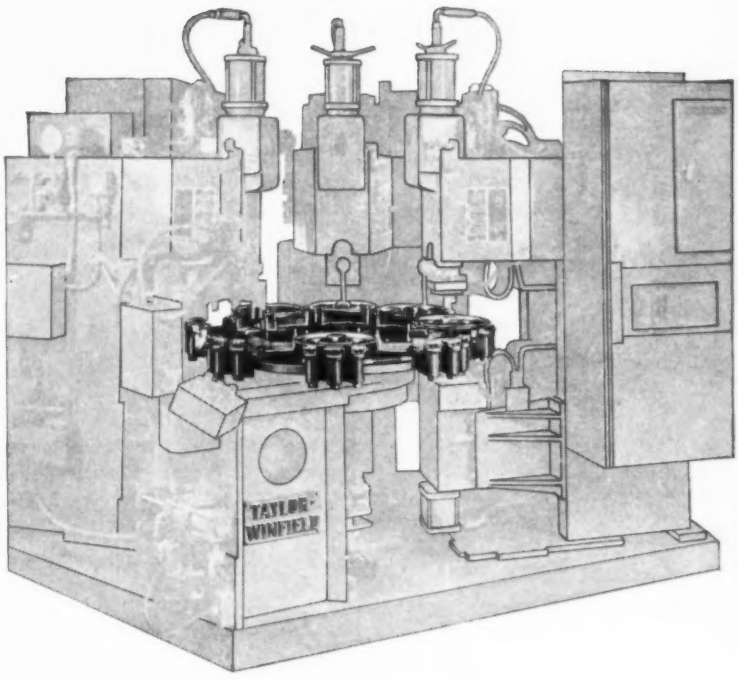
Stainless Castings Cut Corrosion

Special stainless steel castings help a manufacturer lick two big problems of corrosion and erosion.

The Black-Clawson Co., makers of pulp mill equipment, report that

Inspector hardness checks a stainless feed screw.

one of their biggest problems was finding a material that would stand production conditions. These are exacting and have taken the toll of a number of metals. In making pulp, various cooking liquors are used to



T-W Mechanized Handling Triples Standard Weld Production

Three standard projection welders, mounted around a rotary index table, assemble automobile flex-plates at 600 per hour. In service, this flex-plate connects the automobile flywheel to the crankshaft.

One operator loads three counterweights and a flex-plate on an index table fixture. The machine automatically indexes and welds the weights to the plate at three separate stations. The operator loads continuously and assemblies are unloaded automatically.

Flywheel Flex-Plate

Your use of specially-arranged standard welders readily permits modification, if required by future product design changes. Contact the nearest T-W office for prompt attention to your weld production requirements.

The TAYLOR·WINFIELD Corporation
WARREN, OHIO

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break down wood fibers. In addition, dirt and sand are brought in with the chips. These foreign substances act like tiny files on the equipment.

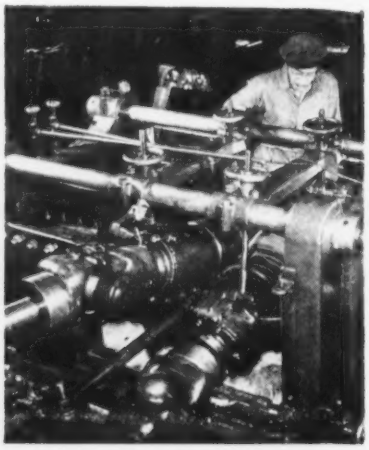
Stainless Does It — To combat corrosion and erosion, the company now uses a special stainless steel, which they call Pandaloy, in the feed screws. These screws are cast at the Buffalo Foundry of Allegheny Ludlum Steel Corp.

Tests and extended production show that the special stainless steel gives excellent service in this rugged application.

Straightens Bars

"Last round-up" is what they call a high-speed straightening operation at Crucible Steel Company's Park Work's, Pittsburgh. The setup works hard-to-straighten alloy steel bars.

The precision rounding up of hot-rolled bars is a final step in preparation for shipping. All of



This unit straightens hard-to-work alloy steel bars.

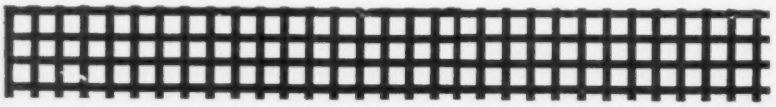
the bars are straightened in two-roll Blaw-Knox-Medart machines of this type. In a typical run, the machine works 27/32-in. diam bars 14 ft long.

Fiber Metals Widely Vary In Porosity

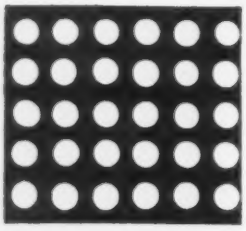
A new porous metal material comes in the form of a continuous sintered sheet of felted metal fibers. It can be varied over a wide range of porosities having high strength-to-porosity ratios.

Derived from a technique called "fiber metallurgy," the material is a development of researchers at Armour Research Foundation of Illinois Institute of Technology, Chicago.

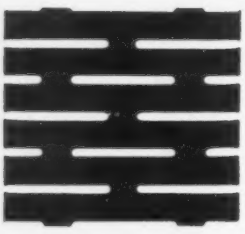
Wide Use Seen—Work leading to practical industrial production of the material by the SOS Co., Chicago, was described at an annual Metal Powder Assn. meeting. Uses of the new product include high temperature filters for aircraft engines, a honeycomb structure to fill tail and rudder sections, a porous material for transpiration cooling systems, and other applications.



metal perforating?
let **WISSCO** *do it*

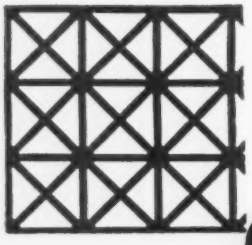


promptly . . . efficiently . . . economically



We are completely equipped to handle all your metal perforating needs. Any metal—stainless and carbon steel, monel, copper, brass, bronze and aluminum.

Our facilities include extensive stock of standard and special dies. Special die-making, rolling, forming, shearing, welding and assembling equipment is available.



We can furnish stock to be perforated or it may be supplied by you.

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CF&I **PERFORATED METALS**
PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
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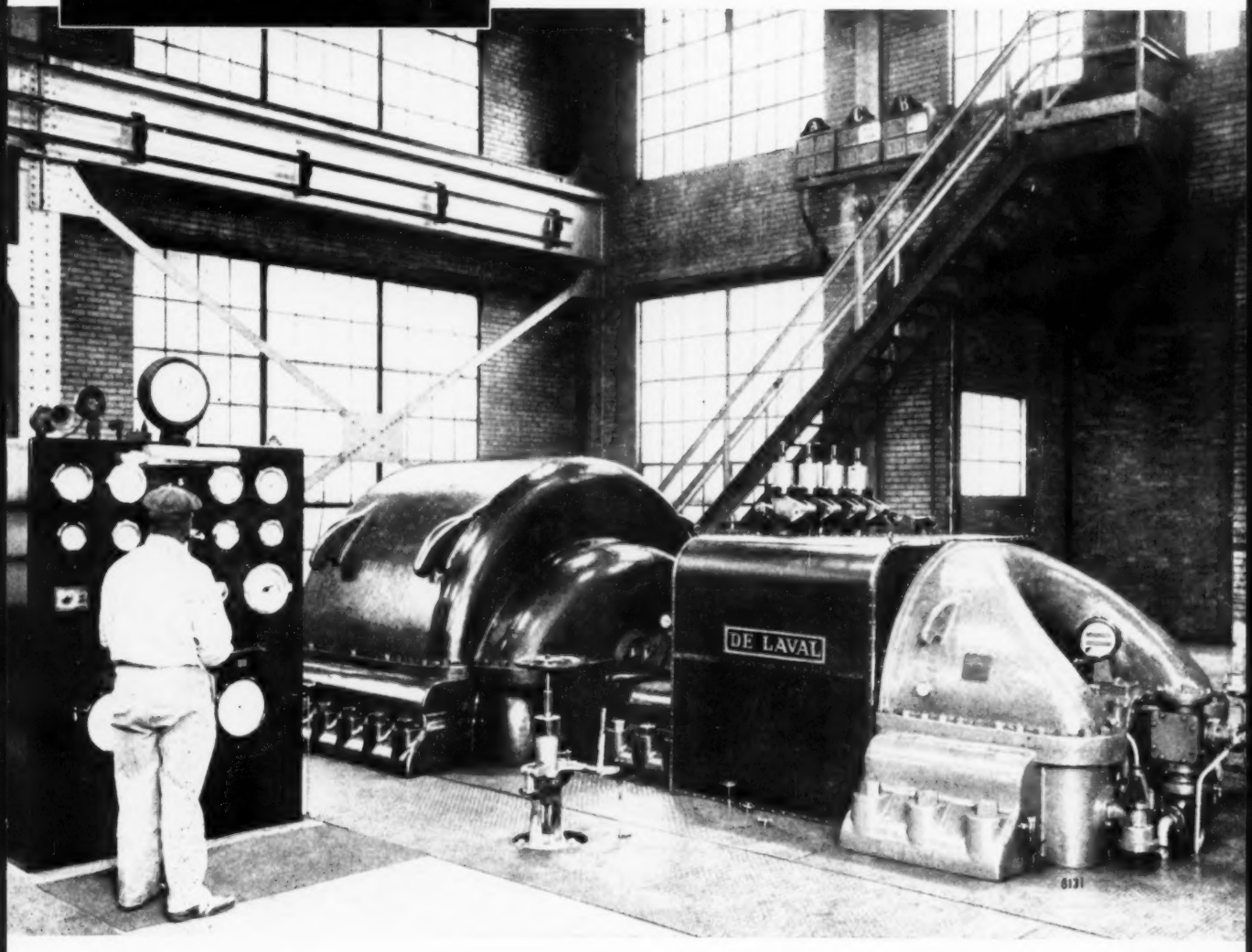
2689

DE LAVAL
BLAST FURNACE BLOWERS

give 20 years of service at Great Lakes Steel Corp.



Shown is one of two De Laval centrifugal blast furnace blowers at the Ecorse, Michigan, plant of the Great Lakes Steel Corporation, Division of National Steel Corporation. This 85,000 cfm unit was installed twenty years ago; another 75,000 cfm unit went on the line a year earlier. Both have given dependable round-the-clock service ever since. These turbine-driven blowers are hooked up to a multi-head which enables either one to be used in conjunction with any of the three blast furnaces.

De Laval centrifugal blowers are built in single and multi-stage types to supply air in volumes up to 150,000 cfm for all classes of service in steel, gas and coke plants. The wealth of application experience acquired by De Laval over the years assures a correct and economical solution to your blower problem.

Send for Bulletin 0504

DE LAVAL *Centrifugal Blowers*

DE LAVAL STEAM TURBINE COMPANY

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TECHNICAL BRIEFS

The latter include possible uses in ceramics and plastics. Here, makers might employ the metal fibers as reinforcing agents. Where they have been used in place of glass reinforcements in these materials, fibers provide a high elastic modulus and they avoid problems of abrasion, say the developers.

Bronzes, carbon and stainless steels, and some high temperature alloys are now being considered for fiber purposes. Present sources are metal wool manufacturers and wire-drawing facilities. However, points out the foundation, other low-cost fiber-making facilities are being developed.

Wide Porosity Range — Sheets range in porosity from 94 pct down to less than 1 pct. The 94-pct-porous material is still self-supporting and has some stiffness.

Makers can control the degree of porosity by diameter and length of the fibers. A brazing material having a lower melting temperature can be added to improve strength and ductility, and after sintering the sheet can be pressed for desired density.

Refractory Cement Holds Materials

Despite temperatures between —420 and 1000°F, a refractory cement holds metal to metal, glass, or ceramics.

Developed by Charles Engelhard, Inc., East Newark, N. J., the adhesive is dielectric and highly shock-resistant throughout its temperature range. The upper limit of this can be extended to 1500°F by modifying the composition. The material remains slightly malleable after drying. It doesn't crack, craze or check even if used on a constantly flexing surface or to join materials with widely different thermal expansion coefficients.

Resists Reagents—The cement is waterproof, nonhydroscopic, and unaffected by most reagents. Specimens put down seven months ago show no signs of aging. The developers engineered the material to attach surface-temperature transducers, strain gages, and lead wires to the skins of guided missiles. Another potential use may be in the repair of small electric furnaces.

In the case of the transducers, they are fully encapsulated in the cement; its crack resistance assures insulation and protection despite severe conditions. Of particular importance in such applications is the cement's high thermal conductivity.

Fights Vibration—A joint of the material between two pieces of metal resists 80 psi of shear force at room temperature up to 900°F. It is unaffected by 15 minutes of 45G vibration through a one-inch double amplitude at 1500 cycles per second. Wires embedded in the cement are not shorted by complete submersion in water.

The surfaces to be joined need only be cleaned with chloroform or trichlorethylene. No mechanical surfacing is required, since the cement has an excellent wetting action. The material can be diluted with xylene to a convenient consistency.

Usually Air-dried — Ordinarily, the cement is air-dried for six hours at at least 60°F, then cured at 300°F for two hours. However, various compositions are available offering different cure times at different temperatures, with or without air-drying. The maker provides an electric curing tape composed of nichrome in an asbestos mat for use where oven curing is inconvenient.

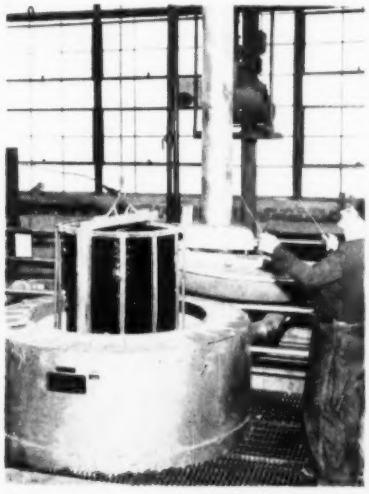
The cement is composed of ground phlogopite, a polysiloxane polymer, and refractory oxides.

Prevents Part Erosion

Erosion of aircraft parts doesn't bother one aircraft maker. Thanks to a specially designed heat treating furnace, this problem is solved.

Jet engine compressor blade rings are treated in the special pit type draw furnace. A unique feature of the units is a basket which makes unloading easier and faster. The basket facilitates discharging of the rings by an overhead hoist.

One complete charge in the furnace weighs about 940 lb. Tempering is carried out between 1100 to 1200°F using cycles from 2 to 6 hours. Supplier of the equipment was Surface Combustion Corp., Toledo, Ohio.



Heat-treater unloads parts from the pit type draw furnace.

Ups Crucible Life

Developed for aluminum melting setups, a protective chemical inner face coating resists dross adherence in crucibles. The coat is said to assure easy and thorough cleaning of crucibles. Crucibles still must be cleaned after each heat, but dross adheres less tightly.

Dross accumulations sometimes cause crucibles to crack and leak long before they actually wear out. Chemically treated surfaces to which the dross does not adhere prolong crucible life.

As one result of the development, Electro Refractories & Abrasives Corp., Buffalo, is now producing a new line of crucibles using the coating.

In-place balancing of a large vertical generator.

PINPOINT and REMOVE VIBRATION with a TINIUS OLSEN Vibrodyne BALANCER

For final check balancing of rotating assemblies, or for locating and removing mechanical vibration in installed equipment . . . you will do the job quicker and easier with the Tinius Olsen Vibrodyne.

This highly sensitive in-place balancer isolates the source of mechanical vibration for accurate detection and correction. Unlike other balancers, the Olsen Vibrodyne employs a tunable pickup. With a simple turn of its frequency control, the Vibrodyne becomes super sensitive to unbalance at the operating speed of the part in the range of 225 to 3600 rpm, using the standard pickup. Extraneous vibrations are effectively eliminated—assuring a finer, more accurate degree of balance. In fact, with an Olsen Vibrodyne, you "start" to balance where other units "stop."

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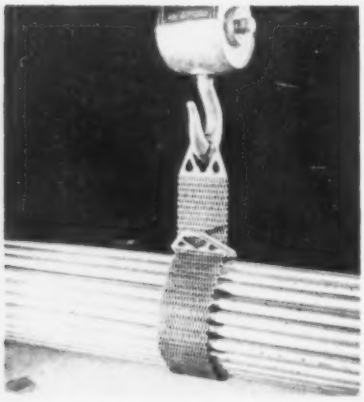


Light Wire Rope Slings Speed Load Rigging

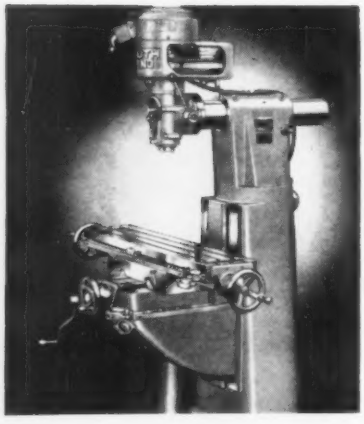
Thin and light, this handle for woven wire slings affords good gripping action. It provides for positive identification of sling size and capacity. The new design consists of a specially machined and drop forged handle. This mechanically fastens to the fabric by means of a stainless steel spiral. It eliminates welding the fabric to the handle. Exactly the same thickness as the fabric itself, the new handle allows for safe and fast rigging of loads. There are no obstructions to catch onto the load in pulling the sling out from under it. The new design is 40-pct lighter than the maker's old-style handle. This makes it easier to handle and rig. To assure positive sling identification, information on size and sling capacity is forged into the new handle. (Cambridge Wire Cloth Co.)

For more data circle No. 1 on postcard, p. 181

Sand-wiper Rammer Has Double Action

Short, light and compact. That describes this new sand rammer for foundry use. The unit has a different front-end design that affords a double-action seal against sand and dirt. A front seal of neoprene felt wipes the surface of the chrome-plated piston rod clean. This prevents the entrance of any sand or dirt into the bore of the guide or the ductile iron barrel. Behind this sand wiper seal is an air seal, a leather ring encircling the piston rod. The complete packing unit is self-adjusting which compensates for wear and keeps power and speed at a maximum level. Air pressure against the seal's face holds it tightly against the rod; it seals with little friction. The chrome-plated piston rides in the smoothly honed ductile iron barrel, reducing frictional losses. Due to the good lubricating qualities of the chrome and ductile iron, a close fit is maintained. Thus, more work get done. (Ingersoll-Rand.)

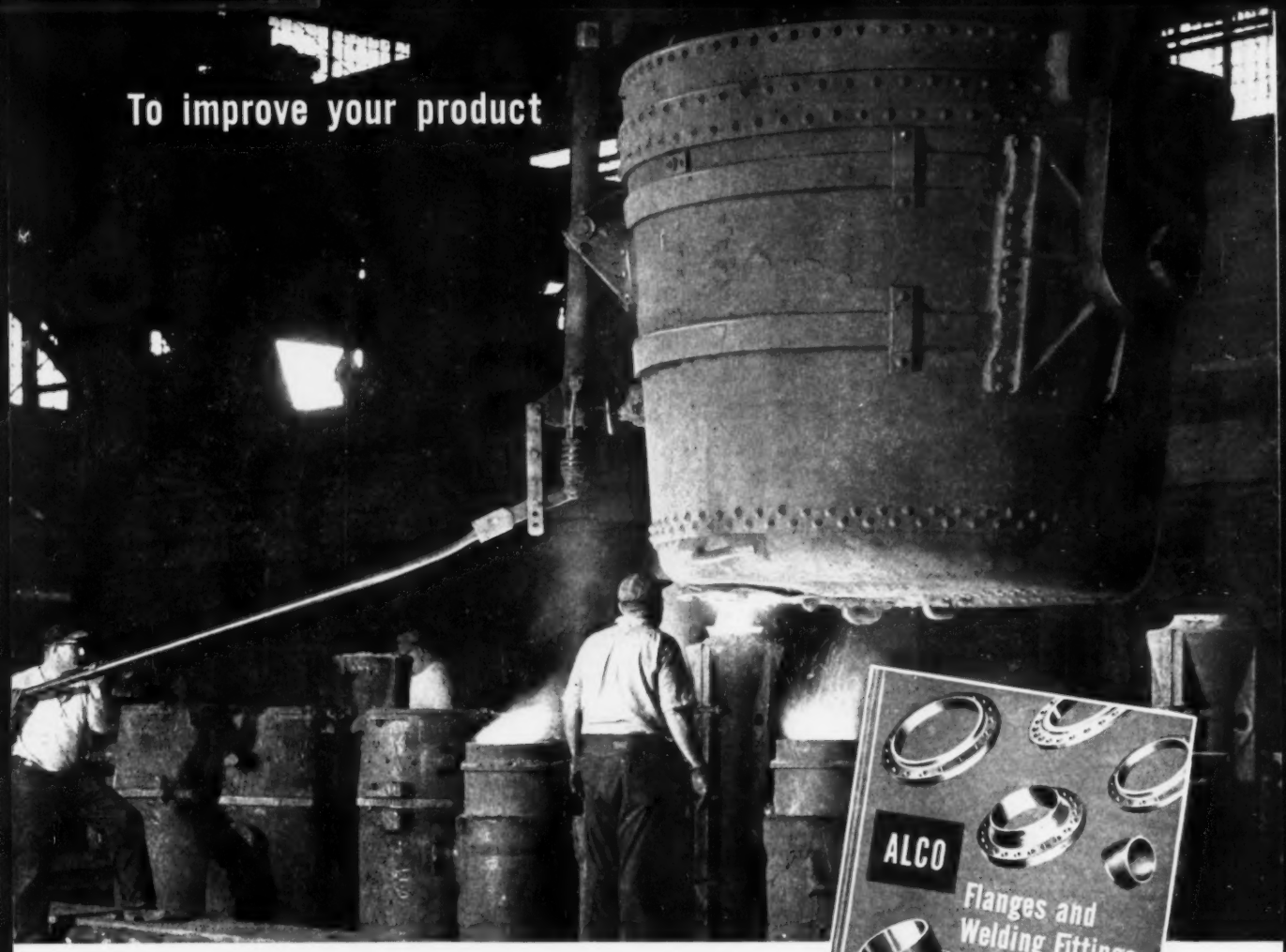
For more data circle No. 2 on postcard, p. 181



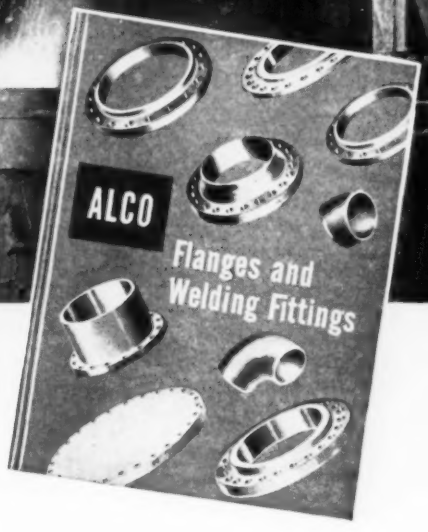
Milling Machine Features Ease of Operation

Featuring ease of operation, this vertical spindle precision milling machine has a head that swivels a full 360° on the flanged end of the overarm for milling, drilling or boring at any angle. A substantial key with a tapered gib prevents the overarm from turning in the column bearing. This permits moving the head transversely without affecting the angular setting of the head. New vernier graduations reading in minutes and a worm gear adjustment permit quick and easy setting of the head angle with extreme precision. Its overarm is 4½-in. in diameter. It has a 15-in. rack and pinion cross movement and can be locked rigidly at any point. The machine's base is strong; reinforcing and bracing make the base and column highly rigid. For ease of operation, the table feed screws have large handwheels. (South Bend Lathe Works.)

For more data circle No. 3 on postcard, p. 181



ONLY ALCO STEEL GOES INTO ALCO FORGED FLANGES



ALCO's own open-hearth furnaces provide steel for ALCO flanges; result is exact steel to fit your requirements, high uniformity of all flanges

At ALCO, to provide you with quality forged flanges of high uniformity and exact chemistry, flange crafting becomes an art. The end result is savings to you in preheat, welding or postheat operations, and the knowledge that you've bought the best.

ALCO's own open-hearth furnaces are the basis of the art. The steel ingots cast from them contain the results of long experience and infinite attention – qualities that are so important for high uniformity in a forged product. Not only that, but ALCO's production of its own steel assures you of prompt delivery.

ALCO flanges are available in standard sizes and types from 18-in. OD to 145-in. OD. Stocks are maintained in Latrobe, Pa. and Beaumont, Tex. "Specials" are produced on order and quickly. Your nearest ALCO representative will give you complete information, or mail us the coupon. We'll be happy to send you our catalog.

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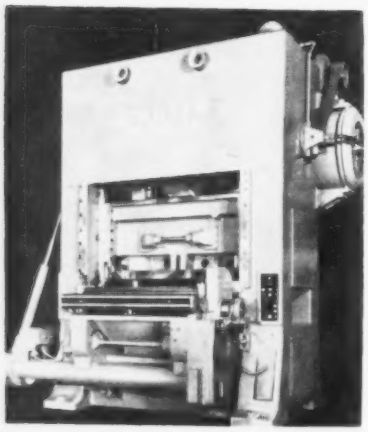
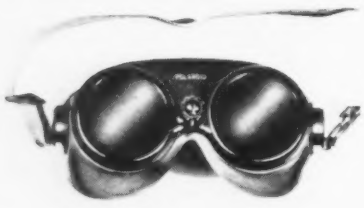


Center Drive Press Works At High Speeds

High speed operation is a feature of this 300-ton two-point straight-side press. It performs automatic progressive operations. The single geared center-drive press operates in the range of 75 to 150 strokes per minute with a standard 3-in. stroke. Bed widths come in sizes 66, 72 or 84-in. right to left and 48-in. front to back. Slide is 34-in. front to back. Mounting the steel herringbone main drive gear in the center of the two point, full eccentric crankshaft helps the press attain unusual speed ranges. The gear is counter-balanced to equalize the weight of the crank eccentrics. This center drive construction reduces torsion and equalizes power transmitted to the slide connections. Standard single or double roll feeds are available to feed from either direction or front to back. The unit has a combination air friction clutch and brake (Minister Machine Co.)

For more data circle No. 4 on postcard, p. 181



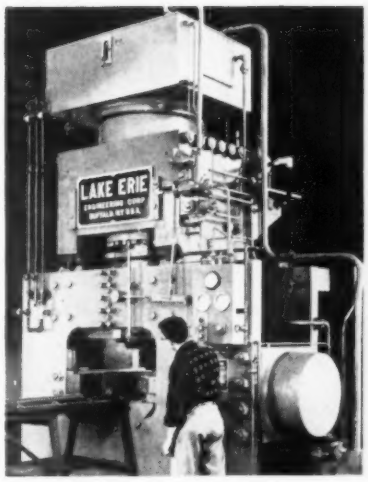
Goggles Guard Eyes Against Flying Particles

For foundrymen, melters, electric furnace operators, etc., these goggles are the headband type with soft rubber eyepieces and nose pads. They adjust in-place through rotation of a small knob on the frame front. Light density is variable from thin smoke shade to near black-out. Tough, double lens offer protection against flying particles. Ventilation helps control fogging and sweating. (Edmund Scientific Co.)

For more data circle No. 5 on postcard, p. 181

"Buff"de Gook Comes Clean
The plate always streaks and bubbles in this deep groove. We're not getting all the buffing compound out, even tho we dumped the electrocleaner just yesterday
And only 5 ounces a gallon at 160°? We'll give it a whirl . . . Say, Al, how'd you learn so much about plating?
"To work for Pennsalt, I had to learn not only your problems but the problems of the drawing shop, the paint shop, the porcelain enamel boys, the aluminum fabricators — everybody who uses chemicals on metal."

Powder Metal Press Makes Zirconium Briquettes



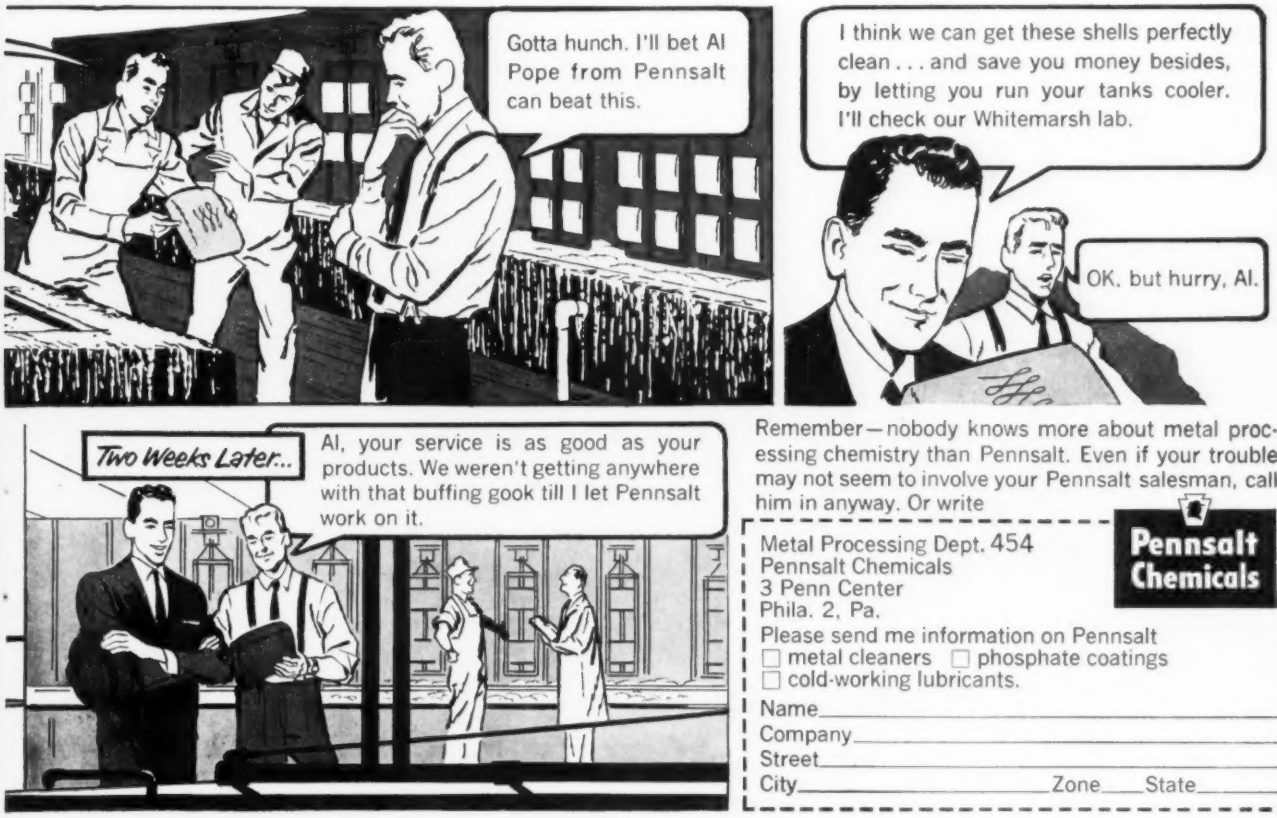
This power-metal press is a 1000-ton briquetting unit. The angle molding type hydraulic press makes 2½ x 2½ x 14-in. zirconium briquettes. It handles rectangular or square section shapes as well. Its 500-ton horizontal die sealing ram permits the use of split dies and the resultant easy removal of the briquette. The bed also has an opening through which material may be extruded. Use of a front and back plate design economically furnishes required rigidity. Adjustable V-type gib guides at the front and rear of the press provide guidance for the accuracy of top platen travel. Vertical daylight is 22-in. with an 8-in. shut height. Horizontal daylight is 28-in. combined with a 6-in. ram stroke. Its vertical platen is 30 x 34-in. front to back. Closing speed of the vertical ram is 60-ipm with a 5.4-ipm pressing speed. The horizontal ram closes and presses at 9.5 ipm. Operational control of both rams is by handlever. Total weight: 100,000 lb. (Lake Erie Machinery Corp.)

For more data circle No. 6 on postcard, p. 181

Unit Provides Quick Gas Analysis

Providing quick and accurate analysis of gases and liquids with boiling points up to 350° C is a new instrument. The high temperature gas chromatograph adapts the fundamental principle of gas chromatography. It uses a tubular column; this is packed with a material that separates components by passing them through the column at different rates. Carrier gases, used to move the sample through the column, include hydrogen, helium, carbon dioxide, nitrogen or argon. It's applicable for research, quality control and other analytical problems. (Beckman Instruments, Inc.)

For more data circle No. 7 on postcard, p. 181


Gotta hunch. I'll bet Al Pope from Pennsalt can beat this.
I think we can get these shells perfectly clean . . . and save you money besides, by letting you run your tanks cooler. I'll check our Whitemarsh lab.
OK, but hurry, Al.
Two Weeks Later...
Al, your service is as good as your products. We weren't getting anywhere with that buffing gook till I let Pennsalt work on it.

Remember—nobody knows more about metal processing chemistry than Pennsalt. Even if your trouble may not seem to involve your Pennsalt salesman, call him in anyway. Or write

Pennsalt Chemicals

Metal Processing Dept. 454
Pennsalt Chemicals
3 Penn Center
Phila. 2, Pa.

Please send me information on Pennsalt
☐ metal cleaners ☐ phosphate coatings
☐ cold-working lubricants.

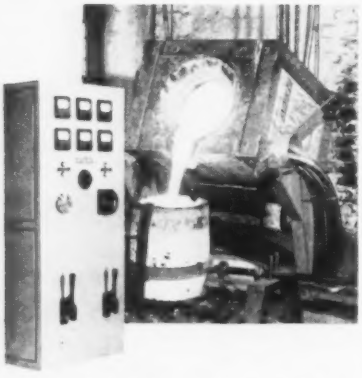
Name_____
Company_____
Street_____
City_____ Zone____ State_____

IT TAKES MODERN

INDUCTO

FURNACES AND CONTROL

TO PACE TODAY'S CASTING PRODUCTION



As surely as castings begin at the furnace, modern casting production begins with Inducto metal melting equipment. Every day, more and more foundrymen are learning to appreciate the way Inducto has combined progressive design features with the well-known advantages of induction melting.

Inducto engineers are alert to the modern casting requirements of higher production, competitive prices, consistent quality and economical operation and have taken positive steps to meet these present-day demands.

Check these features which have made Inducto equipment the leader in the metal melting field:

- Sturdy welded frame construction minimizes distortion . . . increases lining life.
- Compact, precision control saves floor space and gives highly-accurate, stepless control through all heating cycles.
- Water-cooled leads introduced through trunnion, the area of least movement, reduce flexing . . . ensure longer life. Leads are also shorter, cutting power losses.
- Controls designed for simplicity of operation and accessibility of selector switches.
- Lower installation costs with no furnace pits to dig, control panel shipped totally assembled and minimum floor space required.

Send today for Bulletin 70.

INDUCTOTHERM CORPORATION

412 Illinois Ave.
Delanco, N. J.

NEW EQUIPMENT

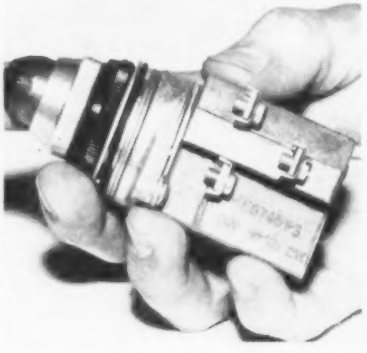
Joins Wire, Batteries

Fully automatic, a recently introduced resistance welder joins stranded copper leadwire to magnesium-encased batteries at a rate of 3600 per hour. Both parts automatically feed into the wire welder, the wire feeds from a spool and the batteries from a loading chute. Wire is tin coated and only 0.024-in. in diam. The magnesium case is 0.040-in. thick. Tooling on the machine permits welding two battery sizes, 1 1/32-in. long by 7/16-in. OD, and 1⅞-in. long by ⅝-in. OD. (Taylor-Winfield Corp.)

For more data circle No. 8 on postcard, p. 181

Checks Bulbs

A push to test indicating light unit quickly, positively tests for burned out lamp bulbs on control panels and push button stations. Through the use of a continuously



energized testing circuit an immediate indication of a faulty bulb is given by pressing the unit's color cap. It is not necessary to remove the indicating light cap or the bulb. (General Electric Co.)

For more data circle No. 9 on postcard, p. 181

Live Center

For maintenance shops, small machine shops, light production, etc., a new live center features good load capacity and accuracy. Twin-row, angular-contact preloaded ball bearings handle both radial and thrust loads. They do not require relubrication for the life of the center. This is 2500 hours average life, the maker says. Its center nose (point and bearing housing) turns with the work. The unit comes in Morse tapers 1, 2 and 3. (Ideal Industries, Inc.)

For more data circle No. 10 on postcard, p. 181

Furnace

Ready interchangeability of furnace components make this unit suitable for melting, annealing, brazing, sintering, and degassing. The standard model is compact, completely self-contained. It has a 3-in. ID x 6-in. high stabilized zirconia crucible suitable for melting 12 lb (of steel) at up to 2000°C. The furnace is tilt pouring, with a rotary mold turntable. The spherical vacuum chamber opens to provide easy access to all vacuum components. Furnace and vacuum controls are grouped for ease of

WARD STEEL CO.

PROMPT WAREHOUSE SERVICE ONLY

Most Complete Stock in America of

BLUE TEMPERED SPRING STEEL

We believe that the way to sell is to carry a stock which permits satisfying any reasonable warehouse demand.

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CAMBRIDGE 40, MASS.

Branch
3042-3058 W. 51st Street, CHICAGO, ILL.
Phone: Grovehill 6-2600

operation with sight ports with shields and wipers located on the chamber to provide a view of the furnace and molds. Using the same cabinet, power supply and pumping system, the melting furnace becomes a heat treating, annealing, brazing, or sintering furnace. This

is done simply by removing the melting chamber and substituting a horizontal type muffle furnace having a hot zone of either 6-in. ID x 12-in. long or 6-in. ID x 24-in. long for processing at temperatures up to 1050°C. (High Vacuum Equipment Corp.)

For more data circle No. 11 on postcard, p. 181

Steel Strapping

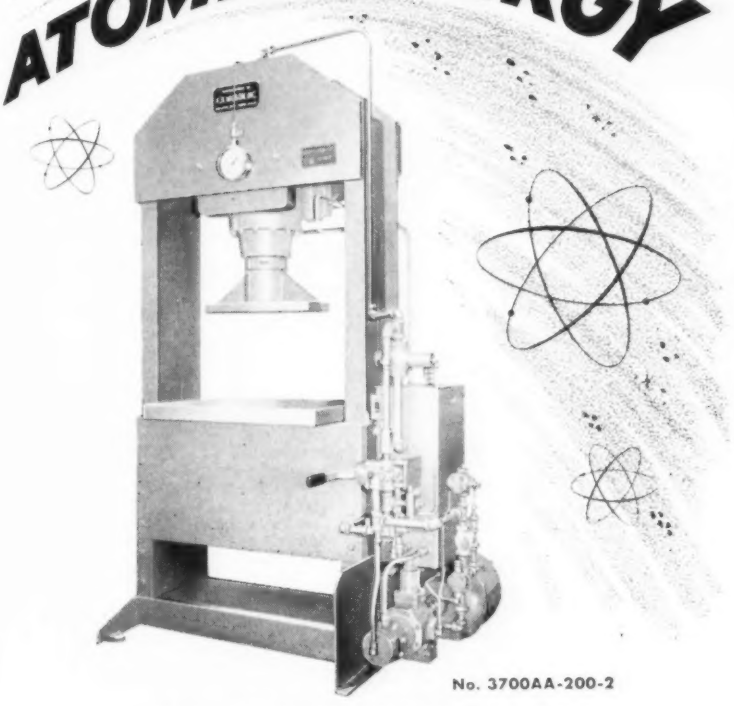
For steel strapping, an air-powered stretcher brings "production line" efficiency to applications using any size of tensional strapping. So states its maker. Weighing less than 4 lb, the stretcher has unlimited take-up and pneumatically controlled tension. These reduce operator fatigue and errors in tensioning. (Brainard Steel Div., Sharon Steel Corp.)

For more data circle No. 12 on postcard, p. 181

Barrel Plater

Having variable cylinder rotation speeds, an automatic barrel plating machine offers a unique method of centralized cycle control. It features an answer to the prob-

K. R. WILSON PRESS HELPS HARNESS ATOMIC ENERGY



No. 3700AA-200-2

DRAMATIC EXAMPLE OF PRESS PROGRESS BY WILSON

Zirconium! . . . in this single word lies a story of remarkable press progress at K. R. Wilson. A press was needed for cutting and pressing zirconium, glistening metal vitally important in the construction of nuclear reactors for atomic energy. The problem was put to Wilson engineers. *The challenge was accepted and a press was built to do the job!* The K. R. Wilson 3700AA-200-2 200-Ton Capacity Motor Driven Hydraulic Press combines all the features necessary to cut and press zirconium with maximum efficiency and economy. The 3700AA-200-2 is but one of scores of examples of the years-ahead technical thinking that makes any type of Wilson press your wisest buy.

CONSIDER THE FEATURES AND YOU'LL CHOOSE WILSON
MODEL No. 3700AA-200-2

HEAVY DUTY RAM 6" diameter heat treated and ground alloy steel ram. 10" bore. 18" stroke.

DOUBLE ACTING CYLINDER Provides power on upstroke for stripping and to offset weight of tooling.

COMPLETE RAM CONTROL Stops in any position; allows you to raise just enough to clear work.

GUIDED RAM Non-rotating ram completely eliminates ram turning.

SIDE-MOUNTED HYDRAULIC UNIT Requires minimum amount of floor space; easily accessible for service.

RAM SPEEDS Rapid Idle Approach Speed to 23 tons, 52" per minute. Pressing Speed to 200 Tons, 8¾" per minute. Rapid Idle Return to 15 Tons, 75" per minute.

FOR FULL DETAILS WRITE FOR BULLETIN No. 37

HYDRAULICS DIVISION

K. R. WILSON, Inc.

OFFICES AND FACTORIES — 208 MAIN ST., ARCADE, NEW YORK, U.S.A.

WATER SAVING
with Trouble-Free
Cooling Equipment

● Cools your jacket water for engines or process equipment or electric apparatus. Your closed system keeps free from dirt or maintenance troubles. You can cool air, gases, chemicals, plating baths, quench baths, welding machines, extrusion and drawing machines and hydraulic presses. You get real precise temperatures, save rejections, lower production costs. Use NIAGARA *AERO* HEAT EXCHANGER cooling with atmospheric air . . . saves water, pumping, piping and power; quickly saves its costs.

Convenient Units up to 30,000,000 BTU Capacity. Write for Bulletin No. 132.

NIAGARA BLOWER COMPANY

Dept. IA-5-2 , 405 Lexington Avenue
New York 17, N. Y.

Niagara District Engineers in Principal Cities of U. S. and Canada

NEW EQUIPMENT

lem of "pile-up" and storage in the plating room. With a return-type conveyor, the machine permits a continuous flow of small parts and hardware from the production department or loading dock, through the machine and back again, without pile-up or manual handling. (Hanson-Van Winkle-Munning Co.)

For more data circle No. 13 on postcard, p. 181

End Mills

Standard end mills for milling aluminum now come in 2, 3, 4 & 6 flute designs; square nose and ball nose types; shell end mills; standard and positive locking shanks; lengths from 2½ to 11⅝-in.; diameters from ¼ to 6 in. Users can select from stock an end mill type and size to meet their exact requirements. (Putnam Tool Co.)

For more data circle No. 14 on postcard, p. 181

Backgeared Press

Operating at 45 strokes per minute, a 37-ton open-back inclinable back geared press is ideal for dial feed or other automatic feed equipment. Designed for drawing parts and other backgeared applications, it has a heavy reinforced frame, a 3¼-in. diam crankshaft with bronze main bearings. Standard stroke is 2½-in. If desired it can give up to a 4-in. stroke. Standard shut height is 10-in. The press can be arranged for shut height up to 20-in. (Sales Service Machine Tool Co.)

For more data circle No. 15 on postcard, p. 181

Gloves

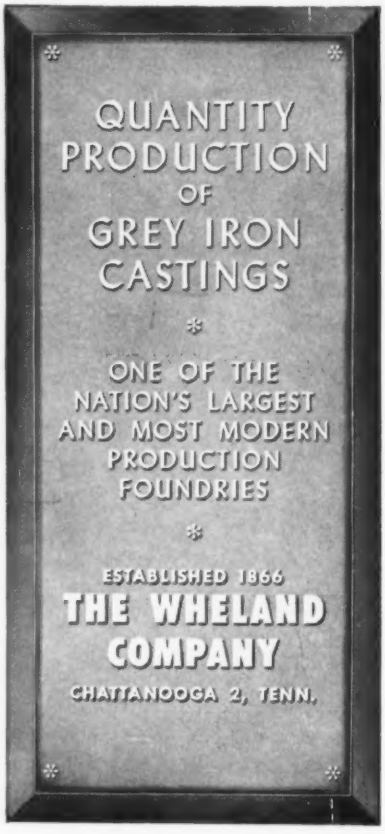
Sturdy and long-wearing, new plastic gloves protect hands from skin infection, guard precision equipment from corrosion caused by perspiration and body acids. The gloves are free from sulfur and do not tarnish metal parts. In addition, they feature high resistance to petroleum-base degreasing agents. Not for use in steam, water or alkali degreasing agents, they pull on or off easily, won't stretch out of shape. Available in standard and

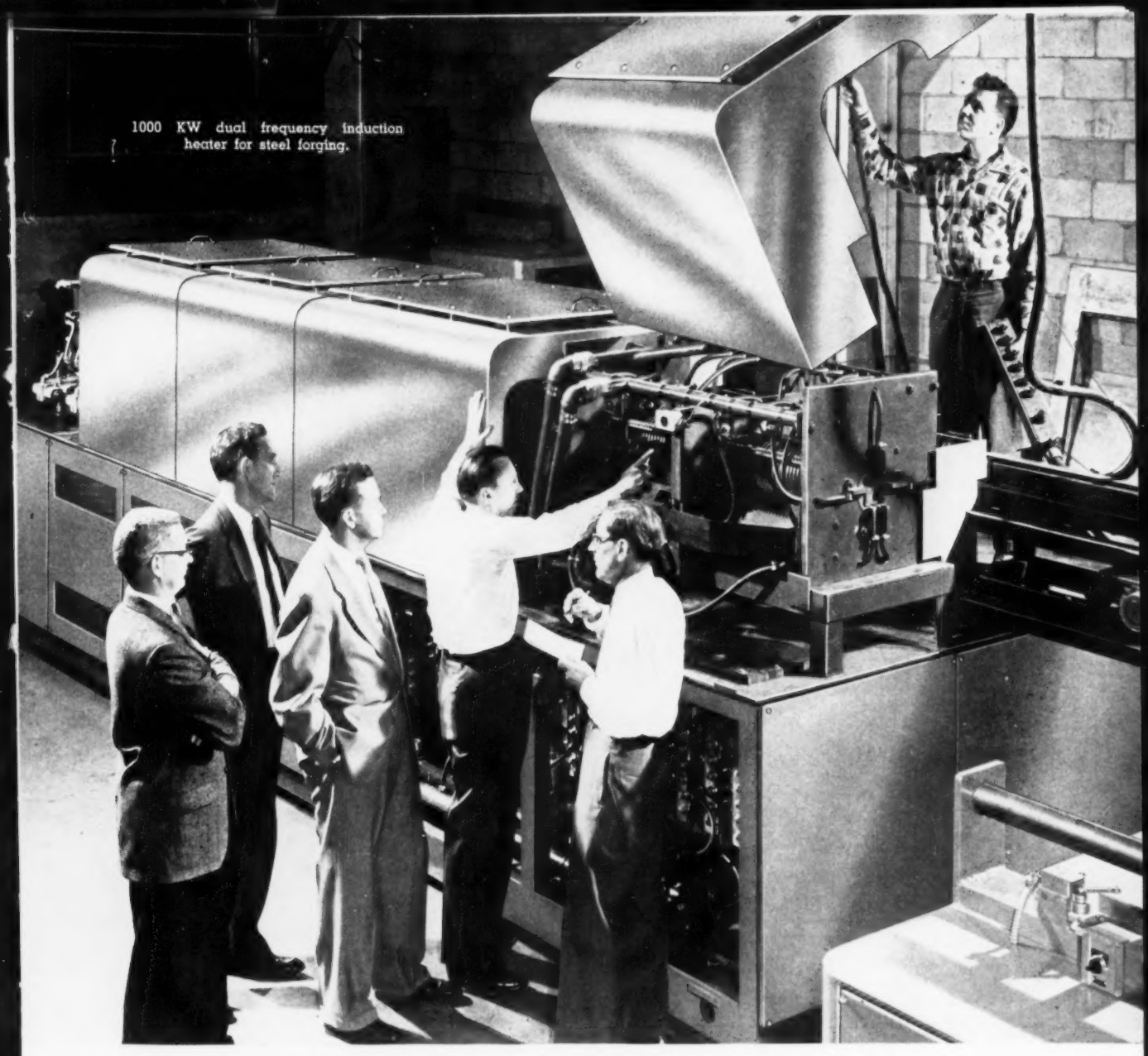
heavy-duty weights, they come in sizes from 8 through 11 and in 10½, 14 and 18-in. lengths. (Wilson Rubber Co.)

For more data circle No. 16 on postcard, p. 181

Pipe, Bolt Unit

Weighing only 260 lb, this heavy-duty pipe and bolt machine uses special aluminum alloy castings. It threads 2-in. pipe in 15 seconds. All gears run in oil. The unit has rack and pinion feed, and right-hand, lathe-like operation. There





1000 KW dual frequency induction heater for steel forging.

James McLaughlin, Sales Manager, Low Frequency; Pete Hassell, Sales Manager, High Frequency; John Logan, President; Bruce McArthur, Vice President; Ted Kennedy, Chief Engineer

the Brass does much more than "TAKE A LOOK"

The Magnethermic brass has a personal interest in this heater.

They have combined their talents on the original design, the application engineering, and the fabrication. Little wonder that they take this close look in the final stages of production.

This procedure is standard—not the exception. All Magnethermic Heaters, large or small, receive day-to-day supervision of the President, Vice President, Chief Engineer and other well-known authorities on induction heating.

Specialized attention to each order for induction heating equipment . . . high, low, or dual frequency can be applied only in a specialized company like Magnethermic where induction heating is the only business.

Induction Heating Equipment 60 to 450,000 cycles

MAGNETHERMIC®
CORPORATION
3990 SIMON ROAD • YOUNGSTOWN 7, OHIO

Push a button for higher production with

READING ELECTRIC HOISTS

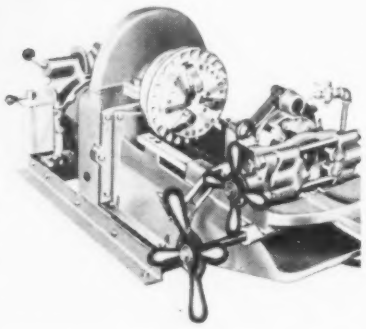
● Ohio Crankshaft's Tocco Division plant is meeting higher production goals with help from Reading Electric Hoists. The new plant was designed with a Reading Hoist "custom-built" into the plans. Write for our latest bulletin "The Why and How of Faster Production".

READING CRANE & HOIST CORP.

CHAIN HOISTS • OVERHEAD TRAVELING CRANES • ELECTRIC HOISTS

2101 ADAMS ST., READING, PA.

are 12 full inches of working space. An increased oil flow delivers over 2-gpm of oil to the dies. The pump is easily accessible for quick cleaning. Mono-type, duo-type and



quadra-type die heads are available with high-speed steel dies. The range for the light machine is ⅛ to 2-in. pipe; ¼ to 2-in. bolts; and up to 12-in. with drive shaft and geared tools. Motors are 110/115 or 220/230-v, 25/60 cycle Universal; or 220/440, 3-phase, 60 cycle. (Beaver Pipe Tools, Inc.)

For more data circle No. 17 on postcard, p. 181

Differential Switch

This differential switch for vacuum and low pressure has a metal diaphragm to give very accurate response. It comes in two classes for sensing pressure differences from 15 in. of water below atmospheric pressure to 80 in. of water above. The fixed actuation value ranges from 0.2 in. of water to 2 in. of water depending on the switch setting. The reference pressure must be air or an inert gas; the variable pressure may be liquid or gas. The switch will actuate an electric circuit on an increase or decrease of a predetermined pressure difference. It readily adjusts by means of an external adjustment screw for field setting. This external adjustment is tamperproof to

WILLIAMS-WHITE C-FRAME PUNCHES and SHEARS

Custom Built to Your Requirements

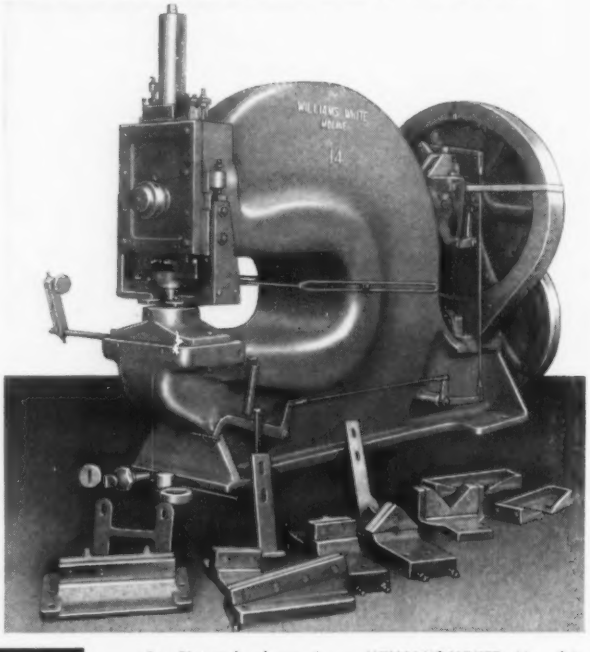
- **Bronze bushed main shaft bearings**
- **Anti-Friction flywheel bearings**
- **Renewable liners in ram pocket**
- **Jaw or friction clutches**
- **Footbutton or treadle control**

Above are some of the features built into C-frame Punches and Shears by WILLIAMS-WHITE & CO. They are regularly built in various capacities and throat depths, either single or double end and with plain or architectural type tables. Frames may be either cast semi-steel, of box section, or of steel plate, welded construction.

REPRESENTATIVES

CALIFORNIA, Los Angeles: George A. Davies Mach'y Co.
ILLINOIS, Chicago: WILLIAMS-WHITE & CO., 53 W. Jackson Blvd.
MICHIGAN, Detroit: E. E. Wood Mach'y Co.
OHIO, Cincinnati: Columbus or Dayton: Seifreat-Elstad Mach'y Co.
Cleveland: A. L. Bechtel & Son
OREGON, Portland: Allied Northwest Mach. Tool Corp.
PENNSYLVANIA, Pittsburgh: Frank Ryman's Sons
Wynnewood (Phila.): Edw. A. Lynch Mach'y Co.
WASHINGTON, Seattle: Perine Mach'y & Supply Co.
WISCONSIN, Milwaukee: Pagel Mach'y Co.

BUILDERS OF MACHINERY SINCE 1854



● Pictured above is a WILLIAMS-WHITE No. 14, Single End Punch of 100 tons capacity, 36-inch throat, with standard punching, angle, plate and bar shearing tools.

For complete details, ask for Bulletin 74

WILLIAMS-WHITE & Co.

302 EIGHTH ST. • MOLINE, ILLINOIS

PRESSES • BULLDOZERS • BENDERS • PUNCHES • SHEARS

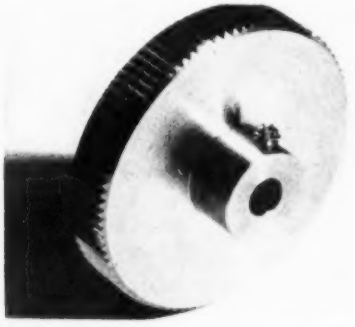
keep it from being accidentally disturbed. The switch is not sensitive to jarring or vibration and it operates in any position; no leveling or

special mounting is necessary. (Barksdale Valves Pressure Switch Div.)

For more data circle No. 18 on postcard, p. 181

Knurled Knobs

A precision small-parts maker is offering a complete line of precision knurled knobs available in three shaft sizes, ⅛, 3/16 and ¼-



in. diam. The outside diameters range from one to two inches. They're made of stainless steel. (Pic Design Corp.)

For more data circle No. 19 on postcard, p. 181

Baggage Truck

This four-wheel truck handles 2000 lb. It can either be pulled manually or by a tractor. Front-wheel brakes automatically apply when the pulling handle is raised to a vertical position; lowering the handle disengages the brake. Overall dimensions: 40 high, 96 long and 52-in. wide. (Lewis-Shepard Products, Inc.)

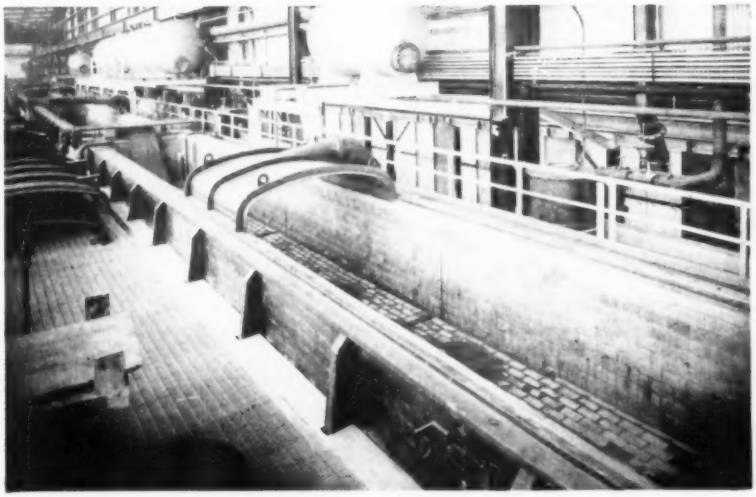
For more data circle No. 20 on postcard, p. 181

the BIG difference

BETWEEN

AVERAGE and ATLAS

PICKLE-TANK CONSTRUCTION



...EXPERIENCE!

Since Atlas installed the first continuous brick-lined pickler in 1933, more than 10,000,000 pounds of Atlas corrosion-proof materials of construction have been used to build all types and styles of pickling tanks throughout the world. The huge pickling tank pictured above was recently installed in a large eastern steel mill and is a typical example of Atlas design and construction in the metalworking field.

Experience has taught us a successful pickling tank requires an integrated combination of highest quality materials, tested and proven design, expert and craftsman-like construction. Only Atlas offers such a service ...a sole source of responsibility, standing behind their installation, controlling every step of the job, from the basic manufacture of the products to the final use of the material.

Why choose the average when you can benefit from the BIG difference of an Atlas pickling tank? One that will be a permanent asset... deliver full service... withstand the rugged abuse of modern pickling operations and not be hampered by down-time for repair of corrosion damage. Make sure you specify ATLAS for your next installation.

Write for Bulletin CC-3 giving complete information on the Atlas line.

ATLAS MINERAL PRODUCTS COMPANY
MERTZTOWN, PENNSYLVANIA

the ONLY **PORTABLE NIBBLER** *that* **CUTS METAL** *Without Distortion!*

Model HN for 10-Gauge Stainless and 8-Gauge Mild Steel. 6" radius.

Pneumatic Nibbler for 10-Gauge Stainless and Mild Steel. 6" radius.

Model MN for 14-Gauge Stainless and 13-Gauge Mild Steel. 1" radius.

Model LNC for 16-Gauge Corrugated Sheet Metal and Sheet Metal Pipe. 1" radius.

Distributed by EASCO PRODUCTS

WRITE · PHONE · WIRE for complete information

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Philadelphia 34, Penna.

PAT. #2278174 #7278311 #2535631

FREE TECHNICAL LITERATURE

New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, p. 181.

Motor Starters

Part winding starters are discussed in a 4-page publication. It gives data on a new unit designed for either ½ or ⅔ part winding starting of standard motors or special part-winding motors for reduced kva inrush. (General Electric Co.)

For free copy circle No. 21 on postcard, p. 181

Stainless

Special stainless steel for jet engine parts, high pressure steam valves, and steam and gas turbine parts is covered in a data sheet. (Allegheny Ludlum Steel Corp.)

For free copy circle No. 22 on postcard, p. 181

Package Drive

How a high speed package drive unit meets many dc power requirements of metalworking machines and equipment is told in a bulletin. (Allis-Chalmers Mfg. Co.)

For free copy circle No. 23 on postcard, p. 181

Metal Stampings

Facilities for producing metal stampings of all types and sizes are described in a liberally illustrated 8-page bulletin. Facilities include mechanical and hydraulic presses, a complete tool and die department, and machining and finishing equipment. Special emphasis is placed on design engineering service. (Bossert Div., Rockwell Spring and Axle Co.)

For free copy circle No. 24 on postcard, p. 181

Wing Nuts

Stock sheets list specifications of a wide assortment of special design wing nuts. (Gries Reproducer Corp.)

For free copy circle No. 25 on postcard, p. 181

No-corrode Fans

Designed for severe corrosive air-handling jobs, a new corrosion-resistant, impact-resistant resin-bonded fiber glass fume fan will not support combustion. A 4-page folder describes it. (Buffalo Forge Co.)

For free copy circle No. 26 on postcard, p. 181

Hand Trucks

Hydraulic hand pallet trucks of one-ton capacity are described in a bulletin. (The Raymond Corp.)

For free copy circle No. 27 on postcard, p. 181

Drill Presses

Radial drill presses appear in a 4-page bulletin. (Rockwell Mfg. Co.)

For free copy circle No. 28 on postcard, p. 181

Takes Temperatures

Temperature monitoring systems are covered in a bulletin. It de-

scribes: (1) various standard sub-assemblies, (2) the arrangement of these sub-assemblies to form an integrated temperature monitoring system for capacities up to several hundred points. (Thermo Electric Co., Inc.)

For free copy circle No. 29 on postcard, p. 181

Co_2 Process

A 4-page data folder introduces a binder for the foundry. The binder is formulated especially for use with CO_2 process. (Frederick B. Stevens, Inc.)

For free copy circle No. 30 on postcard, p. 181

Ornamental Iron

A 12-page catalog gives data on standard ornamental iron. It tells how to sell ornamental iron with new approach. (Tennessee Fabricating Co.)

For free copy circle No. 31 on postcard, p. 181

Oil Regulator

Oil - air ratio regulators are covered in a 4 - page bulletin. (Hauck Mfg. Co.)

For free copy circle No. 32 on postcard, p. 181

Contour Mill

A hand-guided tracer contour mill is described in a 4-page bulletin. (Colonial - Romulus Div., Colonial Broach and Machine Co.)

For free copy circle No. 33 on postcard, p. 181

Zirconium Tube

Physical properties of zirconium and Zircaloys and mechanical properties of three different tempers of these metals are published in a special analysis memorandum. (Superior Tube Co.)

For free copy circle No. 34 on postcard, p. 181

Welding

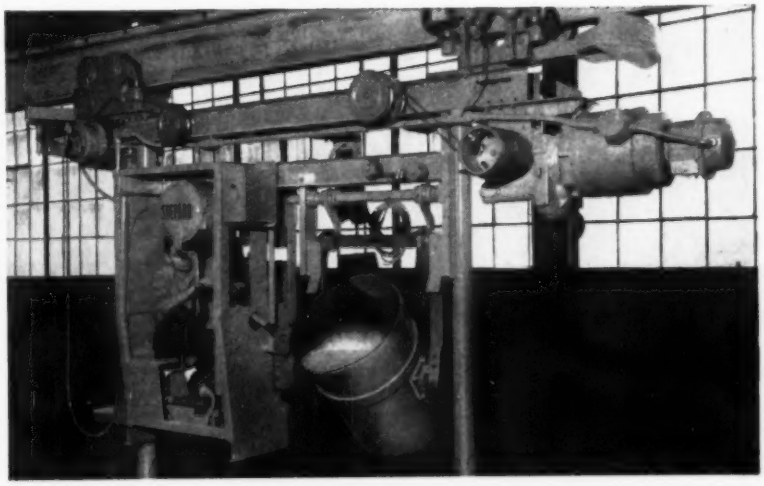
Three booklets offer data on a semi - automatic welding process. The method makes use of a continuously-fed bare wire, powdered

SHEPARD NILES

HOT METAL CARRIER

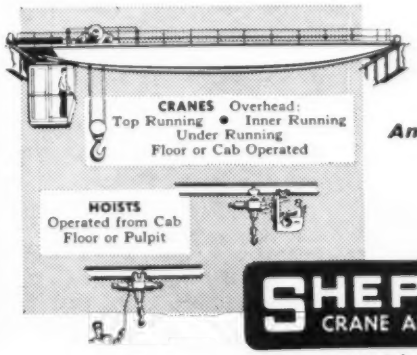
MOVE HOT METAL

the safe, swift, economical way



MECHANIZE YOUR FOUNDRY for labor-saving, low-cost handling. This modern, efficient carrier moves molten metal swiftly and safely from cupola to pouring line.

Shepard Niles cuts costs, saves manpower by enabling one man to transport and pour metal alone. The carrier operator can see perfectly for precision pouring because his cab is on the same level as the metal he's pouring.



Write for latest Bulletin on Shepard Niles Hot Metal Carriers . . . and, while you're about it, request our representative to call.

America's Most Complete Line of Cranes and Hoists Since 1903

SHEPARD NILES
CRANE AND HOIST CORPORATION

1482 Schuyler Ave., Montour Falls, N.Y.

magnetic flux and carbon dioxide gas. The books are on: (1) a better way to weld steel, (2) new continuous-feed arc welding, and (3) Unionarc welding. (Linde Co., div. of Union Carbide Corp.)

For free copy circle No. 35 on postcard, p. 181

Taps

Collapsible taps are reviewed in an 8-page brochure. (Landis Machine Co.)

For free copy circle No. 36 on postcard, p. 181

Castings

Centrifugal castings for strong, pressure-tight, symmetrical shapes are analyzed in an 8-page brochure. (Electro-Alloys Div., American Brake Shoe Co.)

For free copy circle No. 37 on postcard, p. 181

Resistance Welds

A 24-page laboratory bulletin illustrates over 300 different products mass-produced by resistance welding. (The Taylor-Winfield Corp.)

For free copy circle No. 38 on postcard, p. 181

Emergency Light

An emergency escape light is described in a data bulletin. (Micro Switch Div., Minneapolis-Honeywell Regulator Co.)

For free copy circle No. 39 on postcard, p. 181

Impervious Graphite

Recommendations for the application of one firm's impervious graphite and its resin base cements in corrosive service appear in a bulletin. (National Carbon Co.)

For free copy circle No. 40 on postcard, p. 181

Milling Machines

Milling machines equipped with power feed are described in a 4-page folder. The unit mills horizontally, mills vertically and drills. (Benchmaster Mfg. Co.)

For free copy circle No. 41 on postcard, p. 181

It's only part of the National Castings story...

Castings in—
malleable
HTM Metal
(pearlitic malleable)
carbon steel
alloy steel
*manganese steel**
*gray iron**

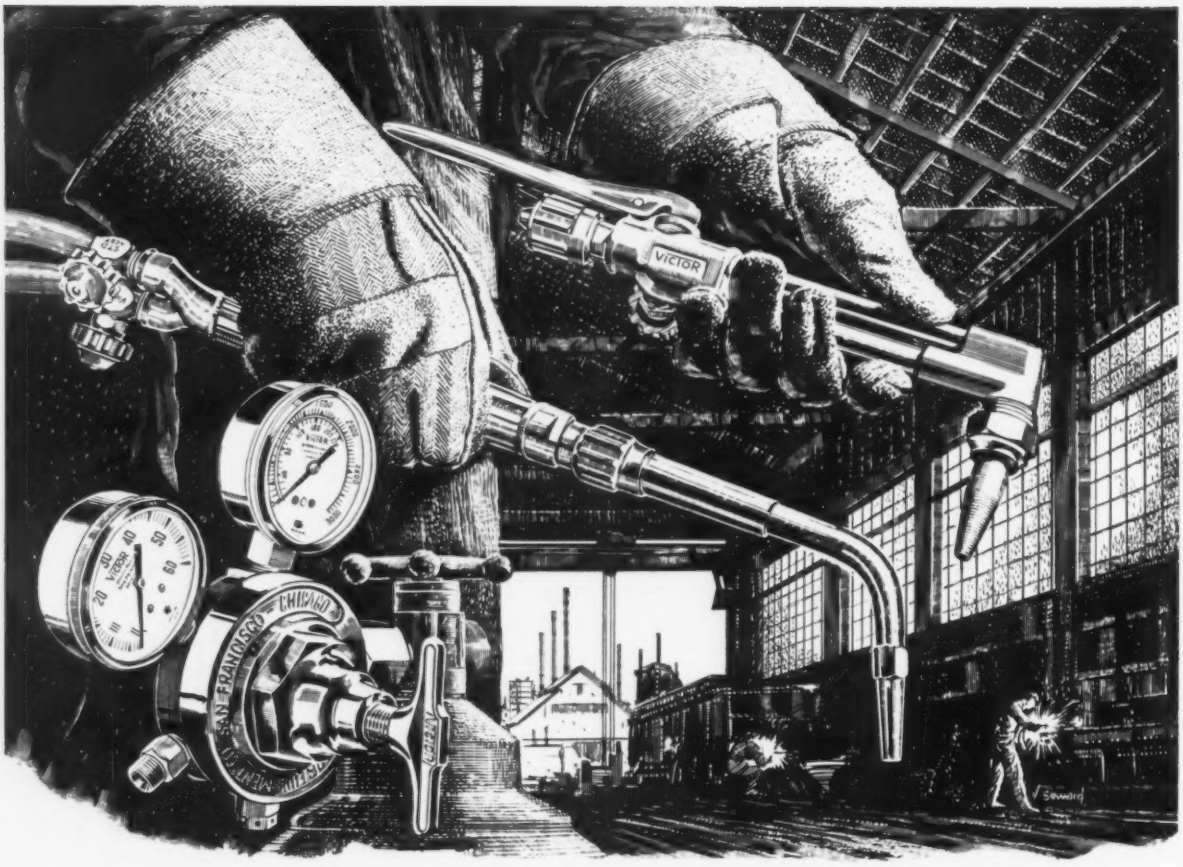
**Only from*
Capitol Foundry Division
Phoenix, Arizona

• Most companies—probably yours—pursue a "multiple source" policy to keep production lines humming. And with National you can continue this policy with several "plus" advantages.

• Individual jobs can be made interchangeable between plants . . . or equipment can be interchanged between plants. This way you get all the advantages of dealing with *one* strong company . . . with unparalleled facilities of *many* plants. Remember it's just part of the National story—flexibility of production with individual attention. AA-6837

NATIONAL MALLEABLE and STEEL CASTINGS COMPANY

Established 1868 • Cleveland 6, Ohio



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FOR EASE OF HANDLING DIFFERENT JOBS . . . Welding, brazing, hardfacing, heating, heat treating, descaling and paint burning. Cutting, trimming, deseaming and weld scarfing.

WITH A WIDE VARIETY OF NOZZLES, TIPS AND CUTTING ATTACHMENTS, with quick-change, hand-tight, time tested sealing ring connections.

RELIABLE FIELD-PROVED REGULATOR DESIGN for safe, dependable pressure and flow control.

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VICTOR EQUIPMENT COMPANY

Mfrs. of welding & cutting equipment; hardfacing rods, blasting nozzles; cobalt & tungsten castings; straightline and shape cutting machines.

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FREE LITERATURE

This section starts on Page 176

These publications describe Money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

Conveyor Furnaces

Variable speed, motor driven belt furnaces are described in a 4-page bulletin. These units reach a maximum temperature of 2100°F. (C. I. Hayes, Inc.)

For free copy circle No. 42 on postcard

Magnetic Grapple

Combination electro-magnet and grapple handling devices are introduced in new company literature. When open, the unit's magnet extends below the grapple. This permits using the magnet alone for clean-up operations. (M. P. McCaffrey Co., Inc.)

For free copy circle No. 43 on postcard

Extrusion Presses

Big extrusion presses are featured in a 4-page folder. It advises readers to design today to take advantage of the firm's new giant extrusion units. (Harvey Aluminum Sales, Inc.)

For free copy circle No. 44 on postcard

Safety Clamps

Safety clamps for lifting plates vertically and horizontally are briefed in a data sheet. It describes a clamp that stays locked securely on a plate once the control cable is pulled. The unit will not loosen even if the hoisting cable becomes slack. (Lucker Mfg. Co.)

For free copy circle No. 45 on postcard

Job Shop

Manpower and machines available for manufacture of various products are offered in a folder. It tells how one firm is tooled up for high production of many items. The brochure says the company has readily available: toolmakers, diemakers, bench and assembly mechanics, machinists, machine operators, production men, maintenance and service employees, engineers, administrative personnel and adequate machining steups. (Karl Lieberknecht, Inc.)

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X-ray Equipment

Intensifying screens and screen-cassette combinations are described in a bulletin and data sheet. Flexible plastic cassettes maintain complete contact with curved objects. Plastic leaded shielding material also is described. (Scientific X-Ray Supply Co., Inc.)

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Die Steel

Three grades of a company's hot work die steel are analyzed in a 4-page bulletin. It covers their elevated temperature physical properties meeting aircraft specifications for structural parts. (Firth-Sterling, Inc.)

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Speed Reducers

Using double-enveloping worm gearing in a firm's speed reducers provides high load-carrying capacity. Complete details on these reducers are presented in a 24-page bulletin. (Michigan Tool Co.)

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Overhead Handling

Polyvinyl chloride shielded electrification for overhead handling systems is discussed in an 8-page booklet. (American MonoRail Co.)

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Blowers

Features and advantages of blower utility sets are contained in a 28-page booklet. Selection factors, such as space volume, quantity of fresh air required, altitude and tem-

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Circle numbers for Free Technical Literature or Information on New Equipment:

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FREE LITERATURE

perature correction, outlet velocity, duct size, static pressure and tip speed are thoroughly discussed. (American Blower Div., American-Standard.)

For free copy circle No. 51 on postcard

X-ray Quantometer

X-ray quantometers for industrial use are covered in a 4-page bulletin. It briefly describes equipment for x-ray fluorescence spectrography. (Applied Research Laboratories.)

For free copy circle No. 52 on postcard

Deep Drawn Parts

Deep drawn eyelet parts are described in a booklet. Prepared for users of formed and deep drawn metal parts, it covers quality considerations inherent in the manufacture of items such as eyelets, shells, cups, and ferrules. (Parts Div., Sylvania Electric Products, Inc.)

For free copy circle No. 53 on postcard

Transformers

In 50-pages, a booklet offers timely tips on transformer maintenance. (Westinghouse Electric Corp.)

For free copy circle No. 54 on postcard

Heat Transfer

A modern heat-transfer fluid-flow laboratory and the Army package power reactor at Fort Belvoir, Va., are featured in articles in a company publication. (Alco Products, Inc.)

For free copy circle No. 55 on postcard

Solvents

Containing 16-pages, a booklet describes fluorinated hydrocarbon solvents for industrial cleaning jobs. (E. I. duPont de Nemours & Co.)

For free copy circle No. 56 on postcard

Carbon Mold Plug

A catalog section introduces a new large size addition to its regularly stocked line of carbon mold plugs. Measuring 6 15/16 in. in large diameter, 6 1/16 in. in small diameter, and 5 in. in length, the new plug weighs approximately 9.7 lb. (National Carbon Co.)

For free copy circle No. 57 on postcard

Timing Motors

Three basic dc timing motors are featured in a bulletin. (The A. W. Haydon Co.)

For free copy circle No. 58 on postcard

Fuel Injection

Fuel injection systems are covered in a dozen-page brochure. It shows cutaway views of four fuel pump assemblies and the injector. The fuel system adapts to all the maker's diesels built since 1932. (Cummins Engine Co., Inc.)

For free copy circle No. 59 on postcard

Regulators

Revised size, capacity and weight tables necessitated by doubling of the maximum inlet pressure of one maker's sensitive regulators are included in a 4-page bulletin. The regulators are for industrial furnaces, engines and similar gas-consuming appliances. (Rockwell Mfg. Co.)

For free copy circle No. 60 on postcard

Casters, Wheels

Industrial casters and wheels are covered in a 56-page catalog. It lists hundreds of types and sizes of casters. (The Hamilton Caster & Mfg. Co.)

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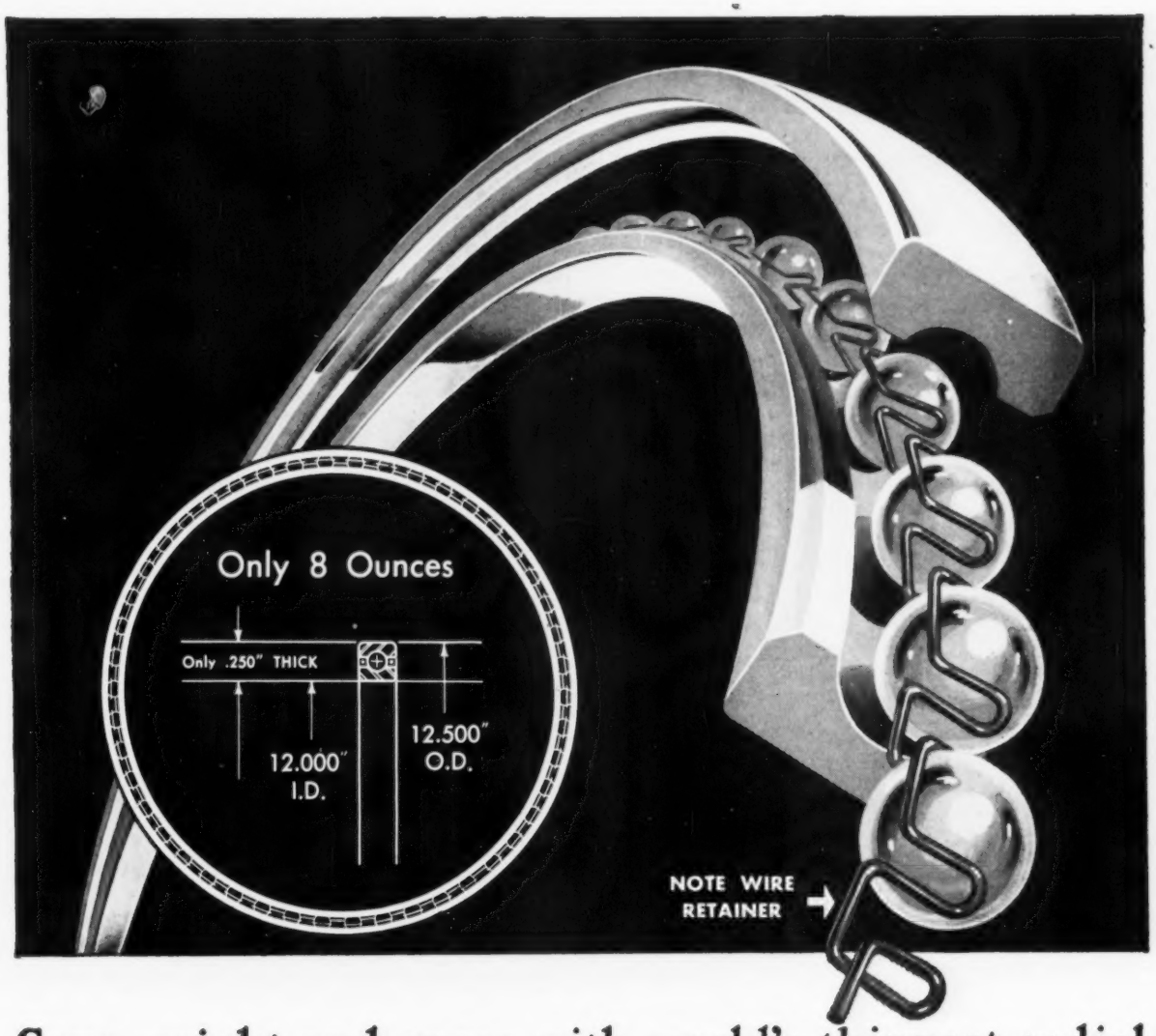
Openhearth Furnaces

Control of pitch flow to openhearth furnaces results in improved product quality and increased plant capacity. So states a firm's data sheet. It tells how an eastern steel mill reports this after applying an area meter to control pitch flow to openhearth furnaces. (Bailey Meter Co.)

For free copy circle No. 62 on postcard



Save weight and space with world's thinnest radial ball bearings—*Reali-Slim* by Kaydon

HERE it is! A *Reali-Slim* radial ball bearing with a wire separator that has just short of a full complement of balls for maximum capacity. What's more, you still get all the advantages of a separator between the balls. This design also gives you a bearing that's light-in-weight and is, without a question, the thinnest bearing ever built in this diameter.

Whatever your product design, there's a small or large diameter *Reali-Slim* bearing that can be the right answer to your thin-section bearing problems.

The radial ball bearing, illustrated here, is *really slim* — 12.000" I.D., 12.500" O.D., .250" thick . . . *and weighs only eight ounces.* It has 9,810 lbs. static load capacity, 1,256 lbs. at 100 rpm. Kaydon is able to produce *Reali-Slim,* high-precision bearings because Kaydon specializes in the unusual.

Kaydon bearing engineers are prepared to give you valuable help with technical, thin-section bearing problems.

For detailed information on Kaydon's *Reali-Slim* line, ask for engineering catalog No. 54-RS3 detailing:

Reali-Slim Ball Bearings — Conrad, angular contact and 4-point contact types in seven standard cross sections from ¼" to 1.000" and in bore diameters from 4" to 40".

Reali-Slim Roller Bearings — Radial and taper roller types in cross sections from 9/16" and in bore diameters from 5" to 40".

THE KAYDON ENGINEERING CORP.

MUSKEGON • MICHIGAN

K-561

All types of ball and roller bearings — 4" to 120" outside diameter . . .
Taper Roller • Roller Thrust • Roller Radial • Bi-Angular Roller • Needle Roller • Ball Radial • Ball Thrust Bearings.

LOW COST DIFFERENCE BETWEEN

SLIPPING FEAR

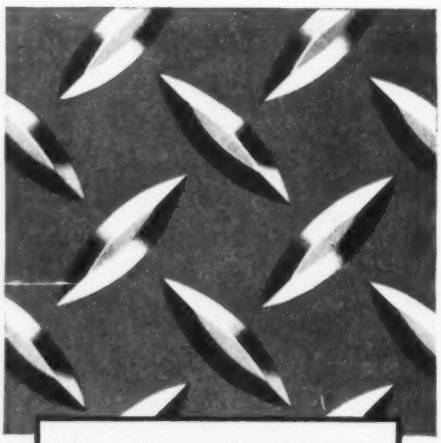
SAFETY

Pattern actual size

Eliminate slipping fear and increase efficiency by installing A.W. Super-Diamond—the low cost safety floor plate that takes the danger out of hazardous slipping areas.

Stops skids and slips *with*	Raised steel figures *diamond-shaped for maximum slip-skid resistance from all approach angles*
Get maximum wear *with*	Tough rolled steel floor plate
Easily fabricated *with*	Ordinary shop equipment
No matching problems *with*	Non-directional pattern—minimum waste
Cleans, drains rapidly *with*	No maintenance problems
Solve your slipping problem *with*	A.W. Super-Diamond as independent flooring, as an overlay—or used structurally.

For complete information write on company letterhead to Dept. SD-S4. *No other floor plate can match A.W. Super-Diamond's safety and durability at so low a cost.*



Wherever oil, grease, or other substances raise special slipping accident hazards, we suggest a check on the special non-slip qualities of A.W. ALGRIP—the world's only abrasive rolled steel safety floor plate.

A.W. SUPER-DIAMOND

ROLLED STEEL FLOOR PLATE

ALAN WOOD STEEL COMPANY • CONSHOHOCKEN, PA.

Other Products: A.W. ALGRIP Abrasive Rolled Steel Floor Plate—Plates—Hot and Cold Rolled Sheet and Strip—(Alloy and Special Grades)

The Iron Age Summary

It's Inventories Versus Prices

Steel users figuring the odds on whether to stock up or take July price boost as it comes.

Market shifts bring hard-sell tactics, courting of foreign users of oil country goods.

■ Steel users this week are fighting the battle of low inventories versus next July's scheduled steel price increase. Some companies, particularly in the Chicago area, have already figured the arithmetic and plumped for fattening inventories as a hedge against the price boost. As a result, steel shipments will go up some next month; but not much.

Here's the situation: Steel users are worried about just how much prices will rise next July. They're sounding out the mills on this, but they're getting nowhere. Some producers are thinking big, and frequent reference is being made to the near-20¢ wage cost increase coming up in July. But although there's some talk of a price boost comparable to last year's average $8.50, chances are it will be under $7 a ton.

The Hard Sell—Current demand for some steel products is generating hard selling by the old-timers in steel sales. They've been on the road for weeks. They're reminding the customers how they took care of them when the market was tight. And they're saying in effect: We took care of you; what are you doing for us? It's paying off. That's why some steel firms are doing better than others.

The hard-sell is creeping in also on a product that several months ago was one of the tightest: Seamless tubes for the oil industry. Reports are that jobber stocks are high. Many of the major oil companies are thinking in terms of cutting inventory. At least 10 big oil outfits have failed to pick up their full tonnages in recent months.

Seamless Easier — Oil country goods producers are reaching out for export business to help take up the slack. One mill has doubled its export business over last year. Selling is more aggressive. A leading producer has junked all allotments, reverted to a first-come-first-served basis. (See page 186.)

In Chicago, cold-rolled sheet buyers are clamoring for delivery before July to beat the price increase. One mill there is sold out through June; others are filling up fast. Hot-rolled sheet for June delivery had picked up earlier. July-August bookings continue very low.

Strong Points — Structural and plate demand is holding strong. Customers will be on a quota basis through third quarter and probably for the rest of the year.

Both the auto companies and appliance makers are holding to a policy of low inventories. But there are some slight signs of better demand from the carmakers. Mills in Detroit detect an upswing in new business compared with April.

Steel Output, Operating Rates

Production	This Week	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	2,228	2,164	2,317	2,388
Ingot Index				
(1947-1949=100)	138.7	134.6	144.2	148.7
Operating Rates				
Chicago	84.0	82.0*	86.0	100.0
Pittsburgh	91.0	90.0*	93.0	100.0
Philadelphia	102.0	101.0*	104.5	100.0
Valley	74.0	79.0	90.0	99.0
West	104.5	101.0*	101.5	100.0
Buffalo	59.5	85.5	97.5	105.0
Cleveland	80.0	81.5*	86.0	106.0
Detroit	88.0	85.0	97.0	97.0
S. Ohio River	82.0	77.0*	59.5	92.0
South	93.0	94.0	95.5	23.5
Upper Ohio R.	87.0	85.0*	95.0	105.0
St. Louis	85.0	85.0	93.0	99.0
Northeast	66.5	66.5*	64.0	93.0
Aggregate	87.0	84.5	90.5	97.0

*Revised

Prices At A Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	5.670	5.670	5.670	5.179
Pig Iron (Gross ton)	$64.56	$64.56	$64.56	$60.29
Scrap, No. 1 hvy (Gross ton)	$47.17	$45.83	$42.17	$49.67
Nonferrous				
Aluminum ingot	27.10	27.10	27.10	25.90
Copper, electrolytic	32.00	32.00	32.00	46.00
Lead, St. Louis	14.80	15.30	15.80	15.80
Magnesium ingot	36.00	36.00	36.00	34.50
Nickel, electrolytic	74.00	74.00	74.00	64.50
Tin, Straits, N. Y.	97.75	98.25*	99.625	96.875
Zinc, E. St. Louis	11.50	11.50	13.50	13.50

*Revised

Seamless Pipe Sales Are Weaker

More selling effort needed as oil producers hold down inventories and bypass full tonnage allotments.

Some producers scrap quota system and put buyers on a first come, first served basis.

▪ A definite weakening in domestic demand for oil country seamless pipe has led to sharp revision in seller strategy.

With jobber stocks high, oil producers are cutting inventories and are not picking up their full allotments. The mills are relying more on aggressive selling. Allotments for both district sales offices and customers are being junked by some mills. Selling by one mill is now on a basis of first come, first served. More attention is given to the export market.

Reasons Why—Mills see several reasons for the decline: Oil producers are concentrating more on foreign activity. Offshore drilling operations have declined. Bad weather this year has hurt.

There's been a drop in the number of oil rigs operating in the U. S. —down from over 2800 last year at this time to about 2350 now. If optimistic estimates of 50,000 wells drilled in 1957 prove out, it would still be 10,000 short of the previously predicted rate.

However, it's possible that increased drilling operations could tighten the oil industry's steel demands. Better weather for drilling would help. And, in any case export business will continue strong.

Sheet and Strip—Inventory filling, plus some interest among consumers in hedge buying to beat price increases, characterize the market.

A leading **Pittsburgh** producer, discounting any talk about a pickup in warehouse sheet business, doesn't see any mill upturn before August. Deliveries are too current to indicate any market strength. Another producer reports June orders as light with some customers not taking anything at all. In general, hot-rolled sheets can be had in 2 to 3 weeks, cold-rolled sheets in 3 to 4 weeks.

Delivery schedules of about 3-4 weeks on hot-rolled sheet and strip and 5-6 weeks on cold-rolled are quoted at **Philadelphia.** They have lengthened about a week in the last month. However, customers are still moving tonnages back. A warehouse there, although loaded with sheet, is holding prime stock for an inventory gain after July price increases. Customers are showing no interest in hedge buying or third quarter ordering.

Leading sheet producers in the **Detroit** area are stocking semi-finished steel or making ingots and slabs for export. Small orders for sheet are coming in at a steady rate, however, as customers fill inventory holes.

Emergency buying of cold-rolled sheet to beat July price increases is noticed at **Chicago.** Hot-rolled pickup showed up earlier. Warehouses, however, aren't buying cold-rolled.

Bar — Market continues slow. Alloy bar producers at **Pittsburgh** are expressing some concern about automotive use of air cylinders cutting steel spring applications from 10 to 25 pct.

Delivery of hot-rolled bar is quoted as three weeks at **Philadelphia.** It could be lower if a buyer catches a rolling of the product he wants.

Detroit area mills feel bar will be one of the last products to show any improvement.

Some pickup in cold-finished bar is evidenced at **Chicago.** Hot-rolled varies with some mills sold out for second quarter and others getting rush pre-July buying.

Pipe and Tubing—Market displays split personality with buttweld weak and other products strong. Falloff in demand for buttweld caused National Tube Works at Fairless to reduce operation rate below normal. In the same market area, however, a customer needing 12-in. linepipe by August had to go out of the country for German product.

Plate—With the exception of light plate, demand exceeds supply in this market. Customers are as much interested in getting August and September tonnages lined up as they are in filling July needs. Some Eastern warehouses are showing caution, restricting their buying to the heavier thicknesses and wider sizes.

Tinplate—Shipments of tinplate are lagging as canmakers sort out heavy tonnages ordered prior to the April 30 price increase. Electrolytic lines, however, continue at capacity levels. Producers expect full operation through the third quarter, with a seasonal lag in the fourth.

PURCHASING AGENTS' CHECKLIST

What steel buyers can expect in a changing market. **P. 83**

Effects of proposed new freight car building program on the steel market are examined. **P. 86**

Government considers a new tool leasing code. **P. 115**

COMPARISON OF PRICES

(Effective May 21, 1957)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in **Heavy Type**; declines appear in *Italics*

	May 21 1957	May 14 1957	Apr. 23 1957	May 22 1956
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	4.675¢	4.675¢	4.675¢	4.325¢
Cold-rolled sheets	5.75	5.75	5.75	5.325
Galvanized sheets (10 ga.)	6.30	6.30	6.30	5.85
Hot-rolled strip	4.675	4.675	4.675	4.325
Cold-rolled strip	6.870	6.870	6.870	6.28
Plate	4.87	4.87	4.87	4.52
Plates, wrought iron	10.40	10.40	10.40	10.40
Stainl's C-R strip (No. 302)	50.00	50.00	50.00	44.50
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$10.30	$10.30	$9.95	$9.85
Tin plates, electro (0.50 lb.)	9.00	9.00	8.65	8.55
Special coated mfg. ternes	9.55	9.55	9.20	9.10
Bars and Shapes: (per pound)				
Merchant bars	5.075¢	5.075¢	5.075¢	4.65¢
Cold finished bars	6.85	6.85	6.85	5.90
Alloy bars	6.125	6.125	6.125	5.65
Structural shapes	5.00	5.00	5.00	4.60
Stainless bars (No. 302)	43.25	43.25	43.25	38.25
Wrought iron bars	11.50	11.50	11.50	11.50
Wire: (per pound)				
Bright wire	7.20¢	7.20¢	7.20¢	6.60¢
Rails: (per 100 lb.)				
Heavy rails	$5.275	$5.275	$5.275	$4.725
Light rails	6.25	6.25	6.25	5.65
Semifinished Steel: (per net ton)				
Rerolling billets	$74.00	$74.00	$74.00	$68.50
Slabs, rerolling	74.00	74.00	74.00	68.50
Forging billets	91.50	91.50	91.50	84.50
Alloy blooms, billets, slabs	107.00	107.00	107.00	96.00
Wire Rod and Skelp: (per pound)				
Wire rods	5.80¢	5.80¢	5.80¢	5.025¢
Skelp	4.625	4.625	4.625	4.225
Finished Steel Composite: (per pound)				
Base price	5.670¢	5.670¢	5.670¢	5.179¢

	May 21 1957	May 14 1957	Apr. 23 1957	May 22 1956
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$68.88	$68.88	$68.88	$65.26
Foundry, Valley	65.00	65.00	65.00	60.50
Foundry, Southern Cin'ti	67.17	67.17	67.17	62.93
Foundry, Birmingham	59.00	59.00	59.00	55.00
Foundry, Chicago	65.00	65.00	65.00	60.50
Basic, del'd Philadelphia	68.38	68.38	68.38	64.48
Basic, Valley furnace	64.50	64.50	64.50	60.00
Malleable, Chicago	65.00	65.00	65.00	60.50
Malleable, Valley	65.00	65.00	65.00	60.50
Ferromanganese, cents per lb‡ 74 to 76 pct Mn base.	12.75¢	12.75¢	12.75¢	9.50¢
Pig Iron Composite: (per gross ton)				
Pig iron	$64.56	$64.56	$64.56	$60.29
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$46.50	$46.50	$42.50	$48.50
No. 1 steel, Phila. area	51.50	49.50	45.50	51.50
No. 1 steel, Chicago	43.50	41.50	38.50	49.00
No. 1 bundles, Detroit	39.00	39.00	34.50	46.50
Low phos., Youngstown	45.50	45.50	42.50	54.50
No. 1 mach'y cast, Pittsburgh	54.50	53.50	49.50	56.50
No. 1 mach'y cast, Philadel'a	56.50	55.50	55.50	55.50
No. 1 mach'y cast, Chicago	47.00	45.50	44.50	51.50
Steel Scrap Composite: (per gross ton)				
No. 1 heavy melting scrap	$47.17	$45.83	$42.17	$49.67
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$15.38	$15.38	$15.38	$14.50
Foundry coke, prompt	$17.50-$19	$17.50-$19	$17.50-$19	$17.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	32.00	32.00	32.00	46.00
Copper, Lake, Conn.	32.00	32.00	32.00	46.00
Tin Straits, New York	97.75‡	98.25*	99.625	96.875
Zinc, East St. Louis	11.50	11.50	13.50	13.50
Lead, St. Louis	14.80	15.30	15.80	15.80
Aluminum, virgin ingot	27.10	27.10	27.10	25.90
Nickel, electrolytic	74.00	74.00	74.00	64.50
Magnesium, ingot	36.00	36.00	36.00	34.50
Antimony, Laredo, Tex.	33.00	33.00	33.00	33.00

† Tentative. ‡ Average. * Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite

Averages of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

←To identify producers, see Key on P. 198→

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	66.50	67.00	67.50	68.00	
Birmingham *R3*	58.50	59.00*			
Birmingham *W9*	58.50	59.00*	63.00		
Birmingham *U4*	58.50	59.00*	63.00		
Buffalo *R3*	64.50	65.00	65.50	66.00	
Buffalo *H1*	64.50	65.00	65.50	66.00	
Buffalo *W6*	64.50	65.00	65.50	66.00	
Chester *P2*	66.50	67.00	67.50		
Chicago *I4*	64.50	65.00	65.00	65.50	
Cleveland *A5*	64.50	65.00	65.00	65.50	69.50†
Cleveland *R3*	64.50	65.00	65.00	65.50	
Duluth *I4*	64.50	65.00	65.00	65.50	69.50†
Erie *I4*	64.50	65.00	65.00	65.50	69.50†
Everett *M6*	66.00	66.50	67.00		
Fontana *K1*	72.50	73.00			
Geneva, Utah *C7*	64.50	65.00			
Granite City *G2*	66.40	66.90	67.40		
Hubbard *Y1*			65.00		
Ironton, Utah *C7*	64.50	65.00			
Midland *C11*	64.50				
Minnequa *C6*	66.50	67.00	67.50	68.00	
Monessen *P6*	61.50				
Neville Is. *P4*	64.50	65.00	65.00	65.50	69.50†
N. Tonawanda *T1*		65.00	65.50	66.00	
Sharpsville *S3*	64.50	65.00	65.00	65.50	
So. Chicago *R3*	64.50	65.00	65.00		
Swedeland *A2*	66.50	67.00	67.50	68.00	
Toledo *I4*	64.50	65.00	65.00	65.50	
Troy, N. Y. *R3*	66.50	67.00	67.50	68.00	72.50
Youngstown *Y1*			65.00	65.50	

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct); 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. * Add $1.00 for 0.31 0.69 pct phos. † Intermediate low phos. ‡ Add $1.00 for 0.31 to 0.50 pct phos.

Silvery Iron: Buffalo (6 pct), *H1*, $78.50; Jackson, *J1*, *I4* (Globe Div.), $77.25; Niagara Falls (15.01 15.50), $101.00; Keokuk (14.01 14.50), $103.50; (15.51 16.00), $106.50. Add $1.00 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 18 pct. Add $1.25 for each 0.50 pct manganese over 1.00 pct. Bessemer silvery pig iron (under .10 pct phos.): $64.00. Add $1.00 premium for all grades silvery 6 pct to 14 pct

STAINLESS STEEL

Base price cents per lb f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	21.25	22.75	22.25	24.25	—	26.00	38.25	31.00	35.50		16.00	27.75	16.25
Slabs, billets	26.00	29.00	27.00	30.25	30.75	32.00	47.50	38.50	44.75		20.75		21.00
Billets, forging		35.00	35.75	36.50	39.50	39.00	59.75	45.25	53.50	30.75	27.25	27.75	27.75
Bars, struct.	40.50	41.25	42.50	43.25	46.25	46.00	70.25	53.25	62.25	36.25	32.50	33.00	33.00
Plates	42.50	43.25	44.50	45.50	48.00	48.75	73.75	57.50	67.00	38.75	33.75	35.50	34.50
Sheets	46.75	47.25	49.25	50.00	—	53.25	78.25	63.00	76.25	46.50	38.75	46.50	39.25
Strip, hot-rolled	34.50	37.50	35.75	39.00	—	42.50	66.50	51.50	61.00		29.75		30.75
Strip, cold-rolled	43.25	47.25	45.75	50.00	—	53.25	78.25	63.00	76.25	46.50	38.75	46.50	39.25
Wire CF; Rod HR		39.25	40.25 40.50	41.00 41.25	44.00	43.75	66.75 67.00	50.50 51.00	59.25 59.50	34.50	31.00	31.50	31.50

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11*; Brackenridge, Pa., *A5*; Butler, Pa., *A7*; Vandergrift, Pa., *U1*; Washington, Pa., *W2*, *J2*; Baltimore, *E1*; Middletown, O., *A7*; Massillon, O., *R3*; Gary, *U1*; Bridgeville, Pa., *U2*; New Castle, Ind., *I2*; Ft. Wayne, *I4*.

Strip: Midland, Pa., *C11*; Waukegan, Cleveland, *A5*; Carnegie, Pa., *S9*; McKeesport, Pa., *F1*; Reading, Pa., *C2*; Washington, Pa., *W2*; W. Leechburg, Pa., *A5*; Bridgeville, Pa., *U2*; Detroit, *M2*; Canton-Massillon, O., *R3*; Harrison, N. J., *D3*; Youngstown, *C5*; Sharon, Pa., *S1*; Butler, Pa., *A7*; Wallingford, Conn., *U3* (plus further conversion extras); *W1*; New Bedford, Mass. (.25¢ per lb higher), *R6*; Gary, *U1* (.25¢ per lb higher).

Bar: Baltimore, *A7*; S. Duquesne, Pa., *U1*; Munhall, Pa., *U1*; Reading, Pa., *C2*; Titusville, Pa., *U2*; Washington, Pa., *J2*; McKeesport, Pa., *U1*, *F1*; Bridgeville, Pa., *U2*; Dunkirk, N. Y., *A5*; Massillon, O., *R3*; S. Chicago, *U1*; Syracuse, N. Y., *C11*; Watervliet, N. Y., *A5*; Waukegan, *A5*; Canton, O., *T5*; Ft. Wayne, *I4*; Philadelphia, *D5*; Detroit, *R3*; Gary, *U1*.

Wire: Waukegan, *A5*; Massillon, O., *R3*; McKeesport, Pa., *F1*; Ft. Wayne, *I4*; Harrison, N. J., *D3*; Baltimore, *A7*; Dunkirk, *A5*; Monessen, *P1*; Syracuse, *C11*; Bridgeville, *U2*.

Structurals: Baltimore, *A7*; Massillon, O., *R3*; Chicago, Ill., *J4*; Watervliet, N. Y., *A5*; Syracuse, *C11*; S. Chicago, *U1*.

Plates: Brackenridge, Pa., *A5*; Chicago, *U1*; Munhall, Pa., *U1*; Midland, Pa., *C11*; New Castle, Ind., *I2*; Middletown, *A7*; Washington, Pa., *J2*; Cleveland, Massillon, *R3*; Coatesville, Pa., *C15*; Philadelphia, *D5*; Vandergrift, Pa., *U1*; Gary, *U1*.

Forgings billets: Midland, Pa., *C11*; Baltimore, *A7*; Washington, Pa., *J2*; McKeesport, *F1*; Massillon, Canton, O., *R3*; Watervliet, *A5*; Pittsburgh, Chicago, *U1*; Syracuse, *C11*; Detroit, *R5*; Munhall, Pa., S. Chicago, *U1*.

Market Continues To Rebound

It's the old poker game in the scrap trade. Dealers are holding out, hoping to get mills to tip their hand.

But declining operating rate may prevent a serious price situation.

▪ Steel mills are starting to sweat over the scrap situation. Prices have rebounded for several weeks, but the increases have not pulled out scrap in sufficient quantities.

Only speculation that the steel operating rate may decline in the summer months is preventing a more serious price situation.

Meanwhile, the scrap trade is playing a waiting game. Mills are equally determined to keep prices from running away. But offers to buy at lower prices are generally ignored.

Brokers are paying higher than mill price in most markets, in many cases to cover old orders. They are generally reluctant to cover new orders at today's prices.

There isn't a real scrap shortage and few mills are in a serious condition inventory-wise. But good scrap continues hard to get from coast to coast.

The IRON AGE Composite Price continues to climb. It stands at $47.17, compared with $45.83 a week ago.

Pittsburgh — Prices of most grades are unchanged. Flow of scrap into yards has increased a little, but dealer stocks are still low and the market is very tight. Brokers continue to offer mill price and better. They are finding it difficult to get shipments, even at advanced prices. Railroad grades are still strong. Cast also remains strong. The only thing holding the market in check is belief that mill operating rates will continue falling off.

Chicago — Prices again moved up, broker buying prices advancing with the general market. Mill offers to buy at lower prices failed to bring in scrap in any quantity. Dealers are holding what they have. Collections, though picking up, are still not boosting yard inventories and brokers hesitate to cover new orders at present prices. Scrap continues to move out of the area to eastern and southern consuming points. Present advances have not yet discouraged this movement.

Philadelphia—This market continues very strong. Mill buying brought higher prices in almost every category. No. 1 heavy melting was selling for $52, a $2 increase. Willingness on the part of several mills to pay a premium for No. 1 dealer bundles and No. 1 busheling saw those grades rise $4 and $3.50 respectively. Some dealers say the increases are due to brokers caught in a price squeeze.

New York — Heavy export demand plus slower but sustained movement to domestic mills has boosted steelmaking grades $1 in this area to a top of $47 for No. 1 heavy melting steel.

Detroit—Local activity is at a standstill here in anticipation of the closing of June auto lists. Feeling in the trade is that the market is likely to move sideways rather than up or down. Despite lower operating rates, scarcity of dealer scrap is likely to keep prices near their present levels.

Cleveland—Small dealers in the area are shipping machine shop turnings and borings as far as central Pennsylvania at a $7 freight bill to get rid of them. Always in loose supply, they continue to come in from plants but local mills are not interested. Brokers are still covering old openhearth orders in small lots, but dealer stocks are badly depleted.

St. Louis — Dealers are sitting tight on small inventories in expectation of a firming market, forcing broker buying prices higher. Further increases seem likely. Railroad buying by mills lagged, despite an increase in price of $2.

Birmingham—The market has a very strong undertone and dealers say they are unable to fill orders because of small supplies coming into their yards. Brokers are having extreme difficulty filling a large order for No. 2 heavy melting and are paying $3 to $4 per ton higher than the contract price. An electric furnace mill is having little luck placing orders for $50 for electric furnace bundles. Cast is steady.

Cincinnati — Dealers are still shipping on local orders and occasional barge loads are going up river to Pittsburgh area mills. Brokers are having some trouble covering older orders because of low dealer inventories.

Buffalo — Prices of cupola cast and No. 1 machinery cast are up $1 on the basis of sales. Otherwise, there is little activity and most grades are unchanged. A wildcat strike shut down eleven openhearths and one blast furnace is down for repair.

Boston—For the third straight week prices are up and there seems to be a firmer undertone in the market. Unstripped motor blocks now are $27 to $28, based on orders.

West Coast—Flow of scrap to mills has fallen off sharply. Prices remain steady as exceptionally heavy exporting to Japan continues to stimulate the market.

A SYMBOL OF LEADERSHIP IN IRON & STEEL SCRAP SINCE 1889

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EXPORTS-IMPORTS LIVINGSTON & SOUTHARD, INC. 99 Park Ave., New York, N. Y. *Cable Address:* **FORENTRACO**

SCRAP PRICES *(Effective May 21, 1957)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$46.00 to $47.00
No. 2 hvy. melting	43.00 to 44.00
No. 1 dealer bundles	46.00 to 47.00
No. 1 factory bundles	51.00 to 52.00
No. 2 bundles	41.00 to 42.00
No. 1 busheling	46.00 to 47.00
Machine shop turn.	31.00 to 32.00
Mixed bor. and ms. turn.	31.00 to 32.00
Shoveling turnings	35.00 to 36.00
Cast iron borings	35.00 to 36.00
Low phos. punch'gs plate	51.00 to 52.00
Heavy turnings	44.00 to 45.00
No. 1 RR. hvy. melting	51.00 to 52.00
Scrap rails, random lgth.	61.00 to 62.00
Rails 2 ft and under	68.00 to 69.00
RR. steel wheels	60.00 to 61.00
RR. spring steel	60.00 to 61.00
RR. couplers and knuckles	60.00 to 61.00
No. 1 machinery cast	54.00 to 55.00
Cupola cast	46.00 to 47.00
Heavy breakable cast	44.00 to 45.00

Chicago

No. 1 hvy. melting	$43.00 to $44.00
No. 2 hvy. melting	41.00 to 42.00
No. 1 dealer bundles	43.00 to 44.00
No. 1 factory bundles	48.00 to 49.00
No. 2 bundles	36.00 to 37.00
No. 1 busheling	43.00 to 44.00
Machine shop turn.	26.00 to 27.00
Mixed bor. and turn.	28.00 to 29.00
Shoveling turnings	28.00 to 29.00
Cast iron borings	28.00 to 29.00
Low phos. forge crops	54.00 to 55.00
Low phos. punch'gs plate	49.00 to 50.00
Low phos. 3 ft and under	48.00 to 49.00
No. 1 RR. hvy. melting	49.00 to 50.00
Scrap rails, random lgth.	54.00 to 56.00
Rerolling rails	61.00 to 62.00
Rails 2 ft and under	60.00 to 61.00
Locomotive tires cut	54.00 to 55.00
Cut bolsters & side frames	55.00 to 56.00
Angles and splice bars	58.00 to 59.00
RR. steel car axles	72.00 to 73.00
RR. couplers and knuckles	52.00 to 53.00
No. 1 machinery cast	46.00 to 48.00
Cupola cast	42.00 to 43.00
Heavy breakable cast	40.00 to 41.00
Cast iron brake shoe	41.00 to 42.00
Cast iron wheels	49.00 to 50.00
Malleable	56.00 to 57.00
Stove plate	42.00 to 43.00
Steel car wheels	54.00 to 55.00

Philadelphia Area

No. 1 hvy. melting	$51.00 to $52.00
No. 2 hvy. melting	42.00 to 43.00
No. 1 dealer bundles	53.00 to 54.00
No. 2 bundles	41.00 to 42.00
No. 1 busheling	52.50 to 53.50
Machine shop turn.	34.00 to 35.00
Mixed bor. short turn.	35.00 to 36.00
Cast iron borings	35.00 to 36.00
Shoveling turnings	37.00 to 38.00
Clean cast chem. borings	39.00 to 40.00
Low phos. 5 ft and under	55.00 to 56.00
Low phos. 2 ft and under	55.00 to 56.00
Low phos. punch'gs	56.00 to 57.00
Elec. furnace bundles	54.00 to 55.00
Heavy turnings	47.00 to 48.00
RR. steel wheels	59.00 to 60.00
RR. spring steel	59.00 to 60.00
Rails 18 in. and under	68.00 to 69.00
Cupola cast	42.00 to 44.00
Heavy breakable cast	54.00 to 55.00
Cast iron car wheels	59.00 to 60.00
Malleable	61.00 to 62.00
Unstripped motor blocks	37.00 to 38.00
No. 1 machinery cast	56.00 to 57.00

Cleveland

No. 1 hvy. melting	$41.00 to $42.00
No. 2 hvy. melting	35.00 to 36.00
No. 1 dealer bundles	41.00 to 42.00
No. 1 factory bundles	46.00 to 47.00
No. 2 bundles	34.00 to 35.00
No. 1 busheling	41.00 to 42.00
Machine shop turn.	22.00 to 23.00
Mixed bor. and turn.	26.00 to 27.00
Shoveling turnings	26.00 to 27.00
Cast iron borings	26.00 to 27.00
Cut struct'r'l & plates, 2 ft & under	47.00 to 48.00
Drop forge flashings	41.00 to 42.00
Low phos. punch'gs, plate	42.00 to 43.00
Foundry steel, 2 ft & under	42.00 to 43.00
No. 1 RR. heavy melting	46.00 to 47.00
Rails 2 ft and under	69.00 to 70.00
Rails 18 in. and under	70.00 to 71.00
Railroad grate bars	32.00 to 33.00
Steel axle turnings	30.00 to 31.00
Railroad cast	53.00 to 54.00
No. 1 machinery cast	49.00 to 50.00
Stove plate	46.00 to 47.00
Malleable	56.00 to 57.00

Youngstown

No. 1 hvy. melting	$44.00 to $45.00
No. 2 hvy. melting	39.00 to 40.00
No. 1 dealer bundles	44.00 to 45.00
No. 2 bundles	37.00 to 38.00
Machine shop turn.	20.00 to 21.00
Shoveling turnings	27.00 to 28.00
Cast iron borings	27.00 to 28.00
Low phos. plate	45.00 to 46.00

Buffalo

No. 1 hvy. melting	$40.00 to $41.00
No. 2 hvy. melting	35.00 to 36.00
No. 1 busheling	40.00 to 41.00
No. 1 dealer bundles	40.00 to 41.00
No. 2 bundles	32.00 to 33.00
Machine shop turn.	26.00 to 27.00
Mixed bor. and turn.	27.00 to 28.00
Shoveling turnings	31.00 to 32.00
Cast iron borings	27.00 to 28.00
Low phos. plate	44.00 to 45.00
Scrap rails, random lgth.	56.00 to 57.00
Rails 2 ft and under	60.00 to 61.00
RR. steel wheels	49.00 to 50.00
RR. spring steel	49.00 to 50.00
RR. couplers and knuckles	49.00 to 50.00
No. 1 machinery cast	45.00 to 46.00
No. 1 cupola cast	41.00 to 42.00

Detroit

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$37.50 to $38.50
No. 2 hvy. melting	29.00 to 30.00
No. 1 dealer bundles	38.50 to 39.50
No. 2 bundles	29.00 to 30.00
No. 1 busheling	37.50 to 38.50
Drop forge flashings	37.50 to 38.50
Machine shop turn.	20.00 to 21.00
Mixed bor. and turn.	23.00 to 24.00
Shoveling turnings	23.00 to 24.00
Cast iron borings	23.00 to 24.00
Low phos. punch'gs, plate	37.50 to 38.50
No. 1 cupola cast	46.00 to 47.00
Heavy breakable cast	42.00 to 43.00
Stove plate	43.00 to 44.00
Automotive cast	52.00 to 53.00

St. Louis

No. 1 hvy. melting	$41.00 to $42.00
No. 2 hvy. melting	37.00 to 38.00
No. 1 dealer bundles	41.00 to 42.00
No. 2 bundles	32.00 to 33.00
Machine shop turn.	23.00 to 24.00
Cast iron borings	25.00 to 26.00
Shoveling turnings	25.00 to 26.00
No. 1 RR. hvy. melting	17.00 to 18.00
Rails, random lengths	48.00 to 49.00
Rails 18 in. and under	58.00 to 59.00
Locomotive tires uncut	50.00 to 51.00
Angles and splice bars	54.00 to 55.00
Std. steel car axles	67.00 to 68.00
RR. specialties	47.00 to 48.00
Cupola cast	40.00 to 41.00
Heavy breakable cast	37.00 to 38.00
Cast iron brake shoes	36.00 to 37.00
Stove plate	39.00 to 40.00
Cast iron car wheels	42.00 to 43.00
Rerolling rails	58.00 to 59.00
Unstripped motor blocks	37.00 to 38.00

Boston

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$38.00 to $39.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 dealer bundles	38.00 to 39.00
No. 2 bundles	28.00 to 29.00
No. 1 busheling	38.00 to 39.00
Elec. furnace, 3 ft & under	40.00 to 41.00
Machine shop turn.	23.00 to 24.00
Mixed bor. and short turn.	24.00 to 25.00
Shoveling turnings	25.00 to 26.00
Clean cast. chem. borings	28.00 to 29.00
No. 1 machinery cast	42.00 to 43.00
Mixed cupola cast	34.00 to 35.00
Heavy breakable cast	42.00 to 43.00
Stove plate	32.00 to 33.00
Unstripped motor blocks	27.00 to 28.00

New York

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$46.00 to $47.00
No. 2 hvy. melting	36.00 to 37.00
No. 2 dealer bundles	33.00 to 34.00
Machine shop turn.	24.00 to 25.00
Mixed bor. and turn.	25.00 to 26.00
Shoveling turnings	27.00 to 28.00
Clean cast chem. borings	30.00 to 31.00
No. 1 machinery cast	44.00 to 45.00
Mixed yard cast	39.00 to 40.00
Charging box cast	44.00 to 45.00
Heavy breakable cast	44.00 to 45.00
Unstripped motor blocks	31.00 to 32.00

Birmingham

No. 1 hvy. melting	$39.00 to $40.00
No. 2 hvy. melting	33.00 to 34.00
No. 1 dealer bundles	39.00 to 40.00
No. 2 bundles	29.00 to 30.00
No. 1 busheling	39.00 to 40.00
Machine shop turn.	28.00 to 29.00
Shoveling turnings	30.00 to 31.00
Cast iron borings	27.00 to 28.00
Electric furnace bundles	45.50 to 46.50
Elec. furnace, 3 ft & under	43.50 to 44.50
Bar crops and plate	49.00 to 50.00
Structural and plate, 2 ft	48.00 to 49.00
No. 1 RR. hvy. melting	41.00 to 42.00
Scrap rails, random lgth.	50.00 to 51.00
Rails, 18 in. and under	58.00 to 59.00
Angles & splice bars	53.00 to 54.00
Rerolling rails	60.00 to 61.00
No. 1 cupola cast	47.50 to 48.50
Stove plate	47.00 to 48.00
Charging box cast	34.00 to 35.00
Cast iron car heels	38.00 to 39.00
Unstripped motor blocks	38.00 to 39.00

Cincinnati

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$38.00 to $39.00
No. 2 hvy. melting	33.00 to 34.00
No. 1 dealer bundles	38.00 to 39.00
No. 2 bundles	30.00 to 31.00
Machine shop turn.	25.00 to 26.00
Mixed bor. and turn.	23.00 to 24.00
Shoveling turnings	28.00 to 29.00
Cast iron borings	23.00 to 24.00
Low phos. 18 in. & under	49.00 to 50.00
Rails, random lengths	54.00 to 55.00
Rails, 18 in. and under	64.00 to 65.00
No. 1 cupola cast	43.00 to 44.00
Hvy. breakable cast	40.00 to 41.00
Drop broken cast	53.00 to 54.00

San Francisco

No. 1 hvy. melting	$48.00
No. 2 hvy. melting	43.00
No. 1 dealer bundles	47.00
No. 2 bundles	35.00
Machine shop turn.	32.00
Cast iron borings	32.00
No. 1 RR. hvy. melting	48.00
No. 1 cupola cast	55.00

Los Angeles

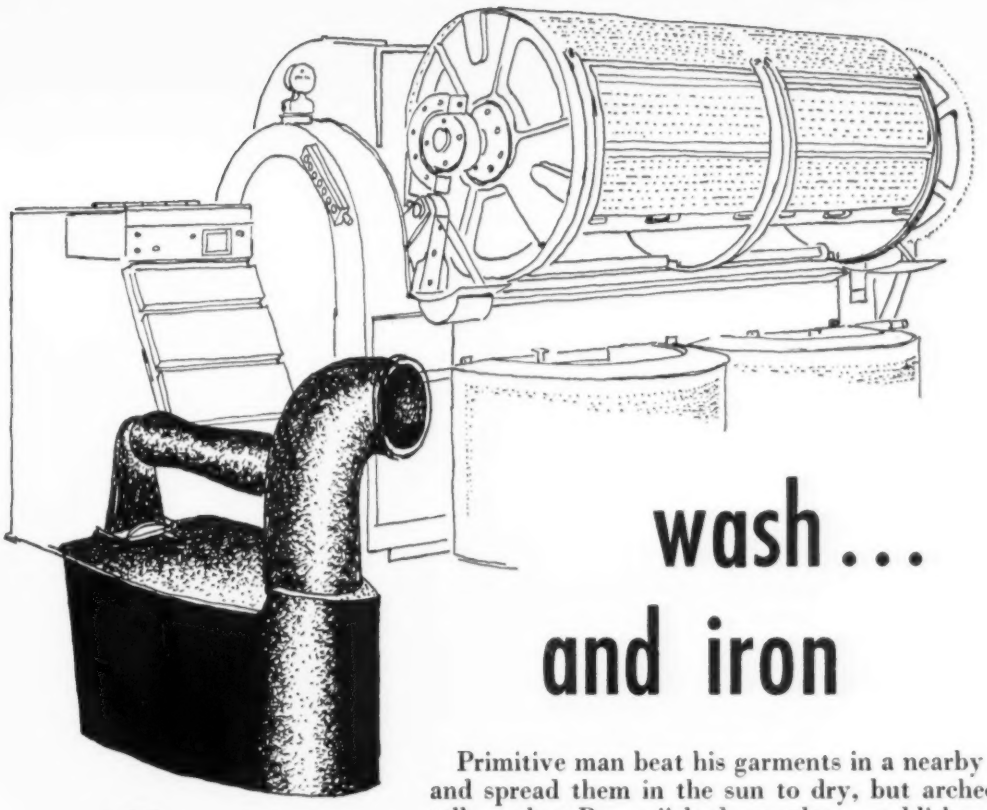
No. 1 hvy. melting	$46.00
No. 2 hvy. melting	43.00
No. 1 dealer bundles	45.00
No. 2 bundles	33.00
Machine shop turn.	32.00
Shoveling turnings	34.00
Cast iron borings	31.00
Elec. furn 1 ft and under (foundry)	57.00
No. 1 RR. hvy. melting	46.00
No. 1 cupola cast	$52.00 to 53.00

Seattle

No. 1 hvy. melting	$46.00
No. 2 hvy. melting	42.00
No. 2 bundles	$28.00 to 30.00
No. 1 cupola cast	47.00
Mixed yard cast	47.00

Hamilton, Ont.

No. 1 hvy. melting	$43.00
No. 2 hvy. melting	38.00
No. 1 dealer bundles	43.00
No. 2 bundles	32.00
Mixed steel scrap	40.00
Busheling	34.00
Bush., new fact., prep'd	43.00
Bush., new fact., unprep'd	37.00
Machine shop turn.	22.00
Short steel turn.	30.00
Mixed bor. and turn.	24.00
Rails, rerolling	54.00
Cast scrap	50.00



wash... and iron

Primitive man beat his garments in a nearby stream and spread them in the sun to dry, but archeologists tell us that Pompeii had complete establishments for the washing of cloths and linens.

Soap reached western Europe probably by way of Rome; and some 300 years ago pressing irons evolved, heated by charcoal. The first mangle was developed in 1771 in Denmark and taken to England; its name derived from its operation by a man and a girl. In 1782, Henry Sidgier of London constructed a washing machine, and the first all-metal washer was made in the United States in 1890. A power laundry was started in this country in 1845.

Today, a huge tonnage of iron and steel is required for domestic washers and ironers—for the equipping and maintenance of thousands of commercial laundries . . . These and countless other civilian and military uses require an enormous production of steel—and scrap is an indispensable ingredient.

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Lead drops another ½¢, but floor may have been reached.

New purchases for stockpile will take advantage of low prices, and also firm the market at present levels.

■ Price of lead behaved exactly as predicted. It fell another ½¢ per lb. Lead now costs 14.80¢ per lb. at St. Louis, 15¢ at N. Y. But it looks like lead and zinc prices have gone about as far as they are going to, at least for several months.

Gordon Gray, director, Office of Defense Mobilization, reports General Services Administration has been authorized to step up purchases for both metals in the next monthly stockpile call, due this week. Deliveries will be made in June.

Two Reasons — Mr. Gray says buying is being stepped up "because of the current market drop." The ODM head looks for two important results: (1) Buying will support the lead and zinc markets, and (2) government will be able to acquire metal at lower prices.

The barter program is just about dead as far as lead and zinc is concerned. Mr. Gray said the Agriculture Dept. has indicated the barter program will be definitely curtailed when it is eventually resumed.

Expect Firmer Market—This is actually a change in signals. Lead and zinc producers had mentally written off stockpiling and were looking to barter for support. But the result will be about the same.

The factors driving the market down had been buyer resistance, and government silence. Now that ODM has handed down an opinion favorable to zinc and lead producers, buyer resistance should thaw. The result will be a firmer market, and prices stabilized, at least for awhile, at current levels.

Brass

Brass mill imports are still denting the domestic market more than U. S. mills consider comfortable. In some products, U. S. mills call the situation very serious. Last week several plans were reported to alleviate the situation.

One is a bill introduced by Rep. James T. Patterson, (R., Conn.) to set up a quota system for admitting imports into this country. While intended specifically to protect brass mills and other industries centered in Rep. Patterson's district, it includes "all articles and commodities which may be imported into the U. S."

The other: Clarence Hancock, import specialist for Copper & Brass Research Assn., told domestic mills to emphasize and publicize quality and rigid adherence to specifications to combat inroads of imports. He maintained that it takes too long to obtain relief through existing government trade procedures, "which may not be entirely effective anyway."

Try For a Law—Rep. Patterson's bill is his second legislative attempt along these lines. The Connecticut Congressman's initial bill included tariffs. It met with considerable opposition from Commerce and State Departments. The new model is designed to "overcome some of these objections."

Basically, the bill provides "the total quantity of the products . . . which may be imported into the U. S. in any calendar year shall not exceed the average of the annual imports of such product into the U. S. during the five-year period ending on December 31 of the fourth year preceding such calendar year."

Slash Imports—This would radically cut the amount of many mill products now being imported.

For brass mill products as a whole, domestic shipments in 1956 were off from 1950, while imports were almost triple.

Year	U. S. Shipments	Imports
1950	2,553,500	30,680
1956	2,219,860	86,513

(In 1000 lbs.)

Passing Outlook Dim—Chances of the Patterson bill passing are not bright. There are now about 16 general import quota bills before Congress, and an estimated 15 or 20 more on specific products. Outlook: Joint hearings on all import quota bills later in the session.

Tin prices for the week: May 15—98.375; May 16—98.00; May 17—98.00; May 20—97.75; May 21—97.75.*

* Estimate

Primary Prices

(cents per lb)	Current price	last price	date of change
Aluminum ingot	27.10	25.90	8/10/56
Aluminum pig	25.00	24.00	8/10/56
Copper (E)	32.00	34.00	2/18/57
Copper (CS)	30.00	30.50	5/9/57
Copper (L)	32.00	34.00	2/19/57
Lead, St. L.	14.80	15.30	5/16/57
Lead, N. Y.	15.00	15.50	5/16/57
Magnesium ingot	36.00	34.50	8/13/56
Magnesium pig	35.25	33.75	8/13/56
Nickel	74.00	64.50	12/6/56
Titanium sponge	250-275	270-300	12/4/56
Zinc, E. St. L.	11.50	12.00	5/13/57
Zinc, N. Y.	12.00	12.50	5/13/57

'ALUMINUM: 99% ingot frt allwd. COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig. Velasco, Tex. NICKEL: Port Colbourne, Canada. ZINC: prime western. TIN: see above; other primary prices, pg. 194.

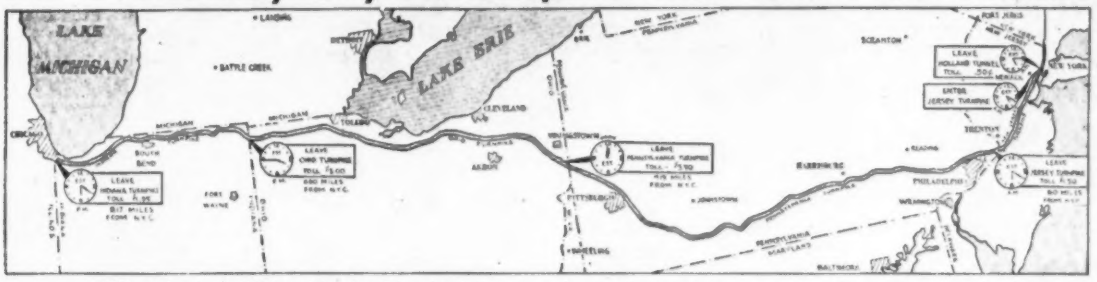
SECOND SECTION
COMICS
PHOTOGRAPHY

New York World-Telegram
The Sun

NEW YORK, TUESDAY, DECEMBER 18, 1956 25

SECOND SECTION
EDITORIALS
SPORTS—FINANCE

Drive to Windy City on Turnpikes Now Is 13-Hour Breeze



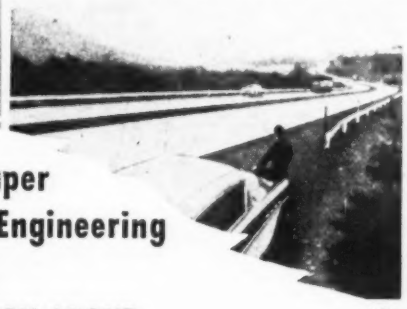
With today's network of high speed turnpikes, Chicago is only 13 hours away for a New York motorist who wants to go west. The turnpike tour from New York to the Windy City is graphically shown above. Follow the dark line, from right to left, and you'll find the key mileage points, the times and the toll costs.

Ellenville Seeking Head for New Bank

ELLENVILLE N. Y. Dec 18 [illegible] shares, which were [illegible] The [illegible] stock [illegible] several of the initial big in- [illegible] have indicat- [illegible] They will [illegible] stock

Brookville Police Official a Suicide

SEA CLIFF, L. I., Dec. 18.—Gordon Hurley, 62, police commissioner of [illegible] on Old Brook



Highway Building Has Come of Age, Quick Trip Shows

By SHELDON BINN,
Staff Writer.

The highway builders have caught up with the auto makers.

Proof? You can now drive from New York to Chicago without seeing a stop light and without crossing an intersection. You can make the run from city line to city line in 13 or 14 hours.

The ring nearly points up how much highway building has caught the Susquehanna Bypass of Sgt. to passengers of just south of Harrisburg days it took the same time to make 200 miles from New York direct to Pittsburgh, and that's just the only halfway to Chicago.

We know it can be done because [illegible] a day we did it. This writer [illegible] the natural fatigue [illegible] photographer Ed Ford left New [illegible] York at 2:20 a.m. [illegible] and [illegible] crossed the Chicago city [illegible] at 6:20 p.m. [illegible] [illegible] at 6:20 p.m. [illegible]

A Famous Newspaper Tells the Story of Recent Engineering Achievement!

HERE'S A SIGNIFICANT STORY ABOUT ONE PHASE OF THIS TURNPIKE CONSTRUCTION

RED LEAD

Protects the 358 Bridges in Pennsylvania
Protects the 360 Bridges in Ohio
Protects the 312 Bridges in Indiana

That distinctive color of RED LEAD is a common sight wherever steel structures are being erected . . . bridges, factories, office buildings, hospitals, apartments . . . skeleton steel has that familiar coat. Over the years Red Lead has been the paint selected to protect iron and steel from corrosion and rightly so, as exhaustive outdoor exposure panel tests have proven its superiority over other pigments as a protective base coating.

While lead is recognized as one of the oldest of metals in the non-ferrous field . . . its use dating back many centuries . . . it still holds its own with the "wonder" metals in our rapidly expanding economy due to its inherent properties and imperishable nature.

Bridge over the Delaware River

Bridge over the Maumee River, Ohio

Bridge over the Pidgeon River, Indiana

ST. JOSEPH LEAD COMPANY
The Largest Producer of Lead in the United States
250 PARK AVENUE, NEW YORK 17, NEW YORK

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

Flat Sheet (Mill Finish) and Plate

("F" temper except 6061-0)

Alloy	.032	.081	.136-.249	.250-8.
1100, 1100, 3003	44.3	42.1	40.9	40.3
5052	51.6	46.8	45.1	43.0
6061-0	48.9	44.6	43.8	43.0

Extruded Solid Shapes

Factor	6063 T-5	6063 T-6
6- 8	42.7-44.4	57.6-61.1
10-14	43.4-44.8	58.4-62.7
24-26	46.4-46.9	68.7-78.1
36-38	54.8-55.4	91.5-94.9

Screw Machine Stock—2011-T-3

Size*	¼	5/16-⅜	½-1	1¼-1½
Price	59.7	58.8	57.4	55.3

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.352	$1.803	$2.254	$2.704
.024 gage	1.686	2.252	2.815	3.378

MAGNESIUM

(F.o.b. shipping Pt., carload frt. allowed)

Sheet and Plate

Type↓ Gage→	.250-3.00	.250-2.00	.188	.081	.063
AZ31B Stand. Grade		67.9	69.0	77.9	103.1
AZ31B Spec.		93.3	95.7	108.7	171.3
Tread Plate		70.6	71.7		
Tooling Plate	73.0				

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade (AZ31C)	69.6	70.7	75.6	89.3
Spec. Grade (AZ31B)	84.6	85.7	90.6	104.3

Alloy Ingot

AZ91B (Die Casting) ..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	126	106	135
Strip, CR	124	108	138
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	120	105	131
Seamless tube	157	129	200
Shot, blocks		87	

COPPER, BRASS, BRONZE

(Freight included on 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	54.13		51.36	54.32
Brass, 70/30	47.02	47.56	46.96	49.93
Brass, Low	49.80	50.44	49.84	52.71
Brass, R L	50.92	51.46	50.86	53.73
Brass, Naval	51.10		45.41	54.51
Muntz Metal	49.19		45.00	
Comm. Bz.	52.48	53.02	52.42	55.04
Mang. Bz.	54.84		48.94	
Phos. Bz. 5%	73.17		73.67	

Free Cutting Brass Rod 35.16

TITANIUM

(10,000 *lb base, f.o.b. mill*)

Sheet and strip, commercially pure, $11.00-$12.10; alloy, $14.75; Plate, HR, commercially pure, $9.25-$9.75; alloy, $11.25. Wire, rolled and/or drawn, commercially pure, $8.50-$9.00; alloy, $11.00; Bar, HR or forged, commercially pure, $7.10-$7.35; alloy, $7.10-$7.30; billets, HR, commercially pure, $6.85-$7.10; alloy, $6.85-$7.05.

PRIMARY METAL

(Cents per lb, unless otherwise noted)

Antimony, American, Laredo, Tex. .. 33.50
Beryllium aluminum 5% Be, Dollar per lb contained Be $74.75
Beryllium copper, per lb cont'd Be $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $71.50
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.70
Calcium, 99.9%, small lots ..... $ 4.55
Chromium, 99.8% metallic basis .. $ 1.31
Cobalt, 97-99% (per lb) .... $2.00 to $2.07
Germanium, per gm, f.o.b. Miami, Okla., refined ..... $48.50-$53.50
Gold, U. S. Treas., per troy oz. $35.00
Indium, 99.9% dollars per troy oz .. $ 2.25
Iridium, dollars per troy oz .... $90 to $100
Lithium, 98% ..... $11.00 to $14.00
Magnesium, sticks, 100 to 500 lb ... 59.00
Mercury, dollars per 76-lb flask, f.o.b. New York ..... $255 to $257
Nickel oxide sinter at Copper Cliff, Ont., contained nickel 71.25
Palladium, dollars per troy oz .. $23 to $24
Platinum, dollars per troy oz .... $92 to $95
Rhodium ..... $120.00 to $125.00
Silver ingots (¢ per troy oz.) 91.375
Thorium, per kg. $43.00
Uranium, normal per kg. $40.00
Vanadium ..... $ 3.45
Zirconium sponge $10.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
No. 115 ..... 30.50
No. 120 ..... 29.25
No. 123 ..... 27.50
80-10-10 ingot
No. 305 ..... 34.50
No. 315 ..... 32.50
88-10-2 ingot
No. 210 ..... 42.25
No. 215 ..... 38.50
No. 245 ..... 34.50
Yellow ingot
No. 405 ..... 25.00
Manganese bronze
No. 421 ..... 28.00

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
0.30 copper max. 24.00-24.75
0.60 copper max. 23.75-24.50
Piston alloys (No. 122 type) .. 23.00-24.50
No. 12 alum. (No. 2 grade) ... 21.00-22.00
108 alloy 21.50-22.00
195 alloy 23.75-25.00
13 alloy (0.60 copper max.) ... 23.75-24.50
AXS-679 ..... 21.50-22.00

Steel deoxidizing aluminum, notch bar granulated or shot

Grade 1—95-97½% 22.00-22.75
Grade 2—92-95% 21.00-21.50
Grade 3—90-92% 20.00-20.50
Grade 4—85-90% 18.75-19.50

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	28	27¼
Yellow brass	21⅛	19⅜
Red brass	24⅜	24
Comm. bronze	25¾	25
Mang. bronze	19¾	19
Yellow brass rod ends	21	.....

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	25¾
No. 2 copper wire	24¾
Light copper	21¾
*Refinery brass	23⅞
Copper bearing material	23

*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	25¾
No. 2 copper wire	24¾
Light copper	21¾
No. 1 composition	23
No. 1 comp. turnings	22½
Hvy. yellow brass solids	17
Brass pipe	19
Radiators	18

Aluminum

Mixed old cast	13½—14½
Mixed new clips	15 —16
Mixed turnings, dry	14 —15

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire	23 —23½
No. 2 copper wire	21½—22
Light copper	19¾—20¼
Auto radiators (unsweated)	15¼—15½
No. 1 composition	20½—21
No. 1 composition turnings	20 —20½
Cocks and faucets	16½—17
Clean heavy yellow brass	14 —14⅛
Brass pipe	17 —17½
New soft brass clippings	18 —18½
No. 1 brass rod turnings	15½—15¾

Aluminum

Alum. pistons and struts	5½— 6
Aluminum crankcases	10½—11
1100 (2S) aluminum clippings	13½—14
Old sheet and utensils	10½—11
Borings and turnings	6½— 7
Industrial castings	10½—11
2024 (24S) Clippings	12 —12½

Zinc

New zinc clippings	4 — 4½
Old zinc	3 — 3¼
Zinc routings	1¾— 2
Old die cast scrap	1¾— 2

Nickel and Monel

Pure nickel clippings	85-90
Clean nickel turnings	70-75
Nickel anodes	85-90
Nickel rod ends	85-90
New Monel clippings	45-48
Clean Monel turnings	35-40
Old sheet Monel	44-45
Nickel silver clippings, mixed	21
Nickel silver turnings, mixed	19

Lead

Soft scrap lead	10½—11
Battery plates (dry)	5½— 6
Batteries, acid free	2¾— 3¼

Miscellaneous

Block tin	75 —76
No. 1 pewter	59 —60
Auto babbitt	39 —40
Mixed common babbitt	11½—12
Solder joints	17 —17½
Siphon tops	...
Small foundry type	13¼—13½
Monotype	13¼—13½
Lino. and stereotype	12¼—12½
Electrotype	11¼—11½
Hand picked type shells	8¾— 8¾
Lino. and stereo. dross	4 — 4¼
Electro. dross	3¼— 3½

STEEL PRICES

(Effective May 21, 1957)

Italics identify producers listed in key at end of table. Base prices, f.o.b., mill in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PIL-ING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$107.00 *B3*		5.05 *B3*	7.40 *B3*	5.05 *B3*						
	Buffalo, N. Y.	$74.00 *B3, R3*	$91.50 *B3, R3*	$107.00 *B3, R3*	5.90 *B3*	5.05 *B3*	7.40 *B3*	5.05 *B3*	4.675 *B3, R3*	6.85 *R7*	6.95 *B3*			
	Claymont, Del.													
	Harrison, N. J.													14.55 *C11*
	Conshohocken, Pa.		$96.50 *A2*	$114.00 *A2*					4.725 *A2*	6.90 *A2*	6.95 *A2*			
	New Bedford, Mass.									7.30 *R6*				
	Johnstown, Pa.	$74.00 *B3*	$91.50 *B3*	$107.00 *B3*		5.05 *B3*	7.40 *B3*							
	Boston, Mass.									7.40 *T8*				14.90 *T8*
	New Haven, Conn.									7.30 *D1*				
	Baltimore, Md.									6.85 *T8*				
	Phoenixville, Pa.					5.85 *P2*		5.85 *P2*						
	Sparrows Pt., Md.								4.675 *B3*		6.95 *B3*			
	Bridgeport, Wallingford, Conn.	$79.00 *N8*	$96.50 *N8*	$107.00 *N8*						7.30 *W1* 6.95 *N8*				
	Pawtucket, R. I. Worcester, Mass.									7.48 *A5,N7*				14.90 *N7*
MIDDLE WEST	Alton, Ill.								4.875 *L1*					
	Ashland, Ky.								4.675 *A7*					
	Canton-Massillon, Dover, Ohio		$94.00 *R3*	$107.00 *R3, T5*						6.85 *G4*		10.10 *G4*		14.55 *G4*
	Chicago, Ill. Franklin Park, Ill. Evanston, Ill.	$74.00 *U1, R3*	$91.50 *U1, R3,W8*	$107.00 *U1, R3,W8*	5.90 *U1*	5.00 *U1,W8* 5.00 *P13*	7.35 *U1,Y1* 6.00 *W8*	5.00 *U1*	4.675 *N4* 4.675 *A1*	6.95 *A1, T8* 6.95 *M8*			7.75 *W8, S9*	14.55 *A1, S9, T8*
	Cleveland, Ohio									6.85 *A5, J3*			7.75 *J3*	
	Detroit, Mich.			$107.00 *R5*					4.775 *G3, M2*	6.95 *M2,G3, D2,P11*	7.05 *G3*	10.10 *G3, D2*	7.75 *G3*	
	Anderson, Ind.									6.85 *G4*		10.10 *G4*		
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana	$74.00 *U1*	$91.50 *U1*	$107.00 *U1, Y1*	5.90 *I3*	5.00 *U1*	7.35 *U1, I3*	5.25 *I3*	4.675 *U1, I3, Y1*	6.85 *Y1*	6.95 *U1, I3, Y1*	10.20 *Y1*	7.75 *U1, Y1*	
	Sterling, Ill.	$74.00 *N4*				5.00 *N4*			4.775 *N4*					
	Indianapolis, Ind.									7.00 *C5*				
	Newport, Ky.												7.75 *A9*	
	Middletown, Ohio													
	Niles, Warren, Ohio Sharon, Pa.		$91.50 *S1, C10*	$107.00 *S1, C10*					4.675 *S1, R3*	6.85 *T4*	6.95 *S1, R3*	10.00 *S1, R3*	7.75 *S1*	14.55 *S1*
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	$74.00 *U1*	$91.50 *U1, C11*	$107.00 *U1, C11*	5.90 *U1*	5.00 *U1, J3*	7.35 *U1, J3*	5.00 *U1*	4.675 *P6*	5.750 *P6* 6.85 *J3,B4, S7*			7.75 *S9*	14.55 *S9*
	Portsmouth, Ohio													
	Weirton, Wheeling, Follansbee, W. Va.					5.00 *W3*			4.675 *W3*	6.85 *W3,F3*	6.95 *W3*	9.65 *W3*		
	Youngstown, Ohio	$74.00 *R3*	$91.50 *Y1, C10*	$107.00 *Y1*			7.35 *Y1*			6.85 *Y1,C5*	6.95 *U1, Y1*	10.20 *Y1*	7.75 *U1, Y1*	
WEST	Fontana, Cal.	$83.50 *K1*	$101.00 *K1*	$128.00 *K1*		5.75 *K1*	8.10 *K1*	5.90 *K1*	5.525 *K1*	8.70 *K1*				
	Geneva, Utah		$91.50 *C7*			5.00 *C7*	7.35 *C7*							
	Kansas City, Mo.					5.10 *S2*	7.45 *S2*		4.925 *S2*		7.20 *S2*			
	Los Angeles, Torrance, Cal.		$101.00 *B2*	$127.00 *B2*		5.70 *C7, B2*	8.05 *B2*		5.425 *B2, C7*	8.90 *C1*			8.95 *B2*	
	Minnequa, Colo.					5.30 *C6*			5.775 *C6*					
	Portland, Ore.					5.75 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$101.00 *B2*			5.65 *B2*	8.00 *B2*		5.425 *C7, B2*					
	Seattle, Wash.		$105.00 *B2*			5.75 *B2*	8.10 *B2*		5.675 *B2*					
SOUTH	Atlanta, Ga.					5.20 *A8*			4.875 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$74.00 *T2*	$91.50 *T2*			5.00 *T2,R3* 5.00 *C16*	7.35 *T2*		4.675 *T2,R3* 4.975 *C10* 4.675 *C16*		6.95 *T2*			
	Houston, Lone Star, Texas	$88.00 *L3*	$96.50 *S2*	$112.00 *S2*		5.10 *S2*	7.45 *S2*		4.925 *S2*		7.20 *S2*			

STEEL PRICES

(Effective May 21, 1957)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS									WIRE ROD	TINPLATE†		BLACK PLATE
		Hot-rolled 18 ga. & hvyr.	Cold-rolled	Galvanized	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot-rolled 19 ga.		Coke* 1.25-lb. base box	Electro* 0.25-lb. base box	Holleware Enameling 29 ga.
EAST	Bethlehem, Pa.													
	Buffalo, N. Y.	4.675 *B3*	5.75 *B3*				6.90 *B3*	8.525 *B3*			5.80 *W6*	† Special coated mfg. terne deduct 50¢ from 1.25-lb. coke base box price. Can-making quality blackplate 55 to 128 lb. deduct $2.20 from 1.25-lb. coke base box. * COKES: 1.50-lb. add 25¢. ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		
	Claymont, Del.													
	Coatesville, Pa.													
	Conshohocken, Pa.	4.725 *A2*	5.80 *A2*				6.95 *A2*							
	Harrisburg, Pa.													
	Hartford, Conn.													
	Johnstown, Pa.										5.80 *B3*			
	Fairless, Pa.	4.725 *U1*	5.80 *U1*				6.95 *U1*	8.575 *U1*				$10.15 *U1*	$8.85 *U1*	
	New Haven, Conn.													
	Phoenixville, Pa.													
	Sparrows Pt., Md.	4.675 *B3*	5.75 *B3*	6.30 *B3*			6.90 *B3*	8.575 *B3*	9.275 *B3*		5.90 *B3*	$10.15 *B3*	$8.85 *B3*	
	Worcester, Mass.										6.10 *A5*			
	Trenton, N. J.													
MIDDLE WEST	Alton, Ill.										6.00 *L1*			
	Ashland, Ky.	4.675 *A7*		6.30 *A7*	6.325 *A7*									
	Canton-Massillon, Dover, Ohio			6.30 *R3,R1*										
	Chicago, Joliet, Ill.	4.675 *W8, A1*					6.90 *U1*			5.80 *K2*	5.80 *A5,R3, N4,W8,K2*			
	Sterling, Ill.										5.90 *N4, K2*			
	Cleveland, Ohio	4.675 *J3, R3*	5.75 *J3, R3*		6.325 *R3*		6.90 *R3*	8.525 *R3, J3*			5.80 *A5*			
	Detroit, Mich.	4.775 *G3, M2*	5.85 *G3* 5.75 *M2*				7.00 *G2*	8.625 *G3*						
	Newport, Ky.	4.675 *A9*	5.75 *A9*											
	Gary, Ind. Harbor, Indiana	4.675 *U1, I3,Y1*	5.75 *U1, I3,Y1*	6.30 *U1, I3*	6.325 *U1, I3,Y1*	6.70 *U1*	6.90 *U1, Y1,I3*	8.525 *U1, Y1*			5.80 *Y1*	$10.05 *U1, Y1*	$8.75 *I3, U1,Y1*	7.50 *U1, Y1*
	Granite City, Ill.	4.675 *G2*	5.95 *G2*	6.50 *G2*	6.525 *G2*								$8.85 *G2*	7.60 *G2*
	Kokomo, Ind.			6.40 *C9*							5.90 *C9*			
	Mansfield, Ohio		5.75 *E2*			6.70 *E2*								
	Middletown, Ohio		5.75 *A7*	6.30 *A7*	6.325 *A7*	6.70 *A7*								
	Niles, Warren, Ohio Sharon, Pa.	4.675 *S1, R3,N3*	5.75 *R3*	6.30 *R3*	6.325 *N3*	6.70 *N3*	6.90 *S1, R3*	8.525 *S1, R3*					$8.75 *R3*	
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	4.675 *U1, J3,P6*	5.75 *U1, J3,P6*	6.30 *U1, J3*	6.325 *U1*		6.90 *U1, J3,R3*	8.525 *U1, J3*	9.275 *U1*		5.80 *A5, P6,J3*	$10.05 *J3, U1*	$8.75 *U1, J3*	7.50 *U1, J3*
	Portsmouth, Ohio	4.675 *P7*	5.75 *P7*								5.80 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	4.675 *W3, W5*	5.75 *W3, W5,F3*	6.30 *W3, W5*		6.70 *W3, W5*	6.90 *W3*	8.525 *W3*				$10.05 *W5, W3*	$8.75 *W5, W3*	7.50 *W5*
	Youngstown, Ohio	4.675 *U1, Y1*	5.75 *Y1*		6.325 *Y1*		6.90 *Y1*	8.525 *Y1*			5.80 *Y1*			
WEST	Fontana, Cal.	5.525 *K1*	7.00 *K1*				7.75 *K1*	9.775 *K1*				$10.80 *K1*	$9.50 *K1*	
	Geneva, Utah	4.775 *C7*												
	Kansas City, Mo.										6.05 *S2*			
	Los Angeles, Torrance, Cal.										6.60 *B2*			
	Minnequa, Colo.										6.05 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.375 *C7*	6.70 *C7*	7.05 *C7*							6.60 *C7*	$10.80 *C7*	$9.50 *C7*	
	Seattle, Wash.													
SOUTH	Atlanta, Ga.													
	Fairfield, Ala. Alabama City, Ala.	4.675 *T2, R3*	.575 *T2*	6.30 *T2, R3*							5.80 *T2,R3*	$10.15 *T2*	$8.85 *T2*	
	Houston, Tex.										6.05 *S2*			

STEEL PRICES

(Effective May 21, 1957)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				6.125 *B3*	8.325 *B3*	7.40 *B3*					
	Buffalo, N. Y.	5.075 *B3,R3*	5.075 *B3,R3*	6.90 *B5*	6.125 *B3,R3*	8.325 *B5,B3*	7.40 *B3*	4.85 *B3*				7.20 *W6*
	Claymont, Del.							5.70 *C4*		6.85 *C4*	7.55 *C4*	
	Coatesville, Pa.							5.25 *L4*		6.85 *L4*	7.55 *L4*	
	Conshohocken, Pa.							4.95 *A2*	5.925 *A2*	6.85 *A2*	7.25 *A2*	
	Harrisburg, Pa.							5.80 *P2*	6.275 *P2*			
	Hartford, Conn.			7.35 *R3*		8.625 *R3*	7.40 *B3*					
	Johnstown, Pa.	5.075 *B3*	5.075 *B3*		6.125 *B3*			4.85 *B3*		6.85 *B3*	7.25 *B3*	7.20 *B3*
	Fairless, Pa.	5.225 *U1*	5.225 *U1*		6.275 *U1*							
	Newark, N. J.			7.30 *W10*		8.50 *W10*						
	Camden, N. J.			7.30 *P10*		8.50 *P10*						
	Bridgeport, Conn. Putnam, Conn.	5.30 *N8*	5.30 *N8*	7.20 *N8* 7.40 *W10*	6.20 *N8*	8.475 *N8*	7.50 *N8*					
	Sparrows Pt., Md.		5.075 *B3*					4.85 *B3*		6.85 *B3*	6.85 *B3*	7.30 *B3*
	Palmer, Worcester, Readville, Mass. Milton, Mass.	5.225 *M7*	5.225 *M7*	7.40 *B5,C14*		8.625 *A5* 8.625 *B5*						7.50 *A5,W6* 9.025 *T8*
	Spring City, Pa.			7.30 *K4*		8.50 *K4*						
MIDDLE WEST	Alton, Ill.	5.275 *L1*										7.40 *L1*
	Ashland, Newport, Ky.							4.85 *A7,A9*		6.85 *A9*		
	Canton, Massillon, Ohio			6.85 *R3,R2*	6.125 *R3,T5*	8.325 *R3,R2, T5*						
	Chicago, Joliet, Ill.	5.075 *U1,R3, W8,N4* 5.075 *P13*	5.075 *U1,R3, N4* 5.075 *P13*	6.85 *A5,B5, W10,L2 W8,N9*	6.125 *U1,R3, W8*	8.325 *A5,B5, W8,L2,N9, W10*	5.875 *W8* 7.425 *U1*	4.85 *U1,13, W8,A1*	5.925 *U1*	6.85 *U1,W8*	7.25 *U1*	7.20 *A5,K2 R3,N4,W7*
	Cleveland, Ohio	5.075 *R3*	5.075 *R3*	6.85 *A5,C13*		8.325 *A5,C13*	7.425 *R3*	4.95 *J3,R3*	5.925 *J3*		7.25 *J3,R3*	7.20 *A5, C13*
	Detroit, Mich.	5.175 *G3*	5.425 *G3*	7.05 *B5,P8* 7.10 *P3* 6.85 *R5*	6.225 *G3* 6.125 *R5*	8.525 *B5,P3, P8* 8.325 *R5*	7.525 *G3*	4.95 *G3*		6.90 *G3*		
	Duluth Minn.											7.20 *A5*
	Gary, Ind. Harbor, Crawfordsville	5.075 *U1,13, Y1*	5.075 *U1,13, Y1*	6.85 *R3,M5*	6.125 *U1,13, Y1*	8.325 *R3,M4*	7.425 *U1,13, Y1*	4.85 *U1,13, Y1*	5.925 *13*	6.85 *U1, Y1*	7.25 *U1, Y1*	7.30 *M4*
	Granite City, Ill.							5.05 *G2*				
	Kokomo, Ind.											7.30 *C9*
	Sterling, Ill.	5.175 *N4*	5.175 *N4*					4.85 *N4*				7.30 *K2*
	Niles, Warren, Ohio Sharon, Pa.			6.85 *C10*	6.125 *C10,S1*	8.325 *C10*	7.425 *S1*	4.85 *S1,R3*		6.85 *S1*	7.25 *S1,R3*	
	Pittsburgh, Pa. Midland, Pa.	5.075 *U1, C11,J3*	5.075 *U1,J3*	6.85 *A5,C8, J3,R3,S9, B4,W10,C11*	6.125 *U1, C11,J3*	8.325 *A5,R3, S9,C8,W10, C11*	7.425 *U1,J3*	4.85 *U1,J3*	5.925 *U1*	6.85 *U1,J3*	7.25 *U1,J3*	7.20 *A5,J3, P6*
	Portsmouth, Ohio											7.20 *P7*
	Weirton, Wheeling, Follansbee, W. Va.							4.85 *W5*				
	Youngstown, Ohio	5.075 *U1, Y1,R3*	5.075 *U1, Y1,R3*	6.85 *U1,Y1, F2*	6.125 *U1,Y1*	8.325 *Y1,F2*	7.425 *U1,Y1*	4.85 *U1,Y1, R3*		6.85 *Y1*	7.25 *Y1* 7.25 *U1*	7.20 *Y1*
WEST	Emeryville, Cal.	5.825 *J5*	5.825 *J5*									
	Fontana, Cal.	5.775 *K1*	5.775 *K1*		7.175 *K1*		8.125 *K1*	5.60 *K1*		7.60 *K1*	8.00 *K1*	
	Geneva, Utah							4.85 *C7*			7.25 *C7*	
	Kansas City, Mo.	5.325 *S2*	5.325 *S2*		6.375 *S2*		7.675 *S2*					7.45 *S2*
	Los Angeles, Torrance, Cal.	5.775 *C7,B2*	5.775 *C7,B2*	8.30 *R3,P14*	7.175 *B2*	10.20 *P14*	8.125 *B2*					8.15 *B2*
	Minnequa, Colo.	5.525 *C6*	5.525 *C6*					5.70 *C6*				7.45 *C6*
	Portland, Ore.	5.825 *O2*	5.825 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	5.775 *C7* 5.825 *B2* 6.025 *P9*	5.775 *C7* 5.825 *B2* 6.025 *P9*				8.175 *B2*					8.15 *C7,C6*
	Seattle, Wash.	5.825 *B2, N6*	5.825 *B2*				8.175 *B2*	5.75 *B2*		7.75 *B2*	8.15 *B2*	
SOUTH	Atlanta, Ga.	5.275 *A8*	5.275 *A8*									7.40 *A8*
	Fairfield, Ala. City, Birmingham, Ala.	5.075 *T2,R3* 5.075 *C16*	5.075 *T2,R3* 5.075 *C16*	7.45 *C16*			7.425 *T2*	4.85 *T2,R3*			7.25 *T2*	7.20 *T2,R3*
	Houston, Ft. Worth, Lone Star, Tex.	5.325 *S2*	5.325 *S2*		6.375 *S2*		7.675 *S2*	4.95 *S2* 5.20 *L3*		6.95 *S2*	7.35 *S2*	7.45 *S2*

† Merchant Quality—Specialty Quality .35¢ higher.

STEEL PRICES *(Effective May 21, 1957)*

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland.
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme-Newport Steel Co., Newport, Ky.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire Spencer Steel Div., Birdsboro, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C5 Cold Metals Products Co., Youngstown, O.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C17 Chester Blast Furnace, Inc., Chester, Pa.

D1 Detroit Steel Corp., Detroit
D2 Dearborn Div., Sharon Steel Corp.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.
G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
H1 Hanna Furnace Corp., Detroit
I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M5 Monarch Steel Div., Hammond, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Evanston, Ill.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N3 Niles Rolling Mill Div., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Northeastern Steel Corp., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Stee Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Rotary Electric Steel Co., Detroit
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In		2½-3 In.		2 In.		2½ In.		3 In.		3½-4 In	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	7.25	+8.00	10.25	+4.00	13.75	0.50	16.25	1.25	16.75	2.25	17.25	2.75	18.75	2.50								
Youngstown *R3*	9.25	+10.00	12.25	+6.00	15.75	+1.50	18.25	0.25	18.75	1.25	19.25	1.75	20.75	2.50								
Fontana *K1*	+3.75	+19.00	+0.75	+15.00	2.75	+10.50	5.25	+9.75	5.75	+8.75	6.25	+8.25	7.75	+8.50								
Pittsburgh *J3*	9.25	+6.00	12.25	+2.00	15.75	2.50	18.25	3.25	18.75	4.25	19.25	4.75	20.75	5.25	5.25	+20.25	1.25	+16.50	3.75	+13.00	5.25	+11.50
Alton, Ill. *L1*	7.25	+8.00	10.25	+4.00	13.75	0.50	16.25	1.25	16.75	2.25	17.25	2.75	18.75	2.50								
Sharon *M5*	9.25	+10.00	12.25	+2.00	15.75	+1.50	18.25	0.25	18.75	1.25	19.25	1.75	20.75	2.50								
Fairless *N2*	7.25	+8.00	10.25	+4.00	13.75	0.50	16.25	1.25	16.75	2.25	17.25	2.75	18.75	2.50								
Pittsburgh *N1*	9.25	+6.00	12.25	+2.00	15.75	2.50	18.25	3.25	18.75	4.25	19.25	4.75	20.75	5.25	5.25	+20.25	1.25	+16.50	3.75	+13.00	5.25	+11.50
Wheeling *W5*	9.25	+6.00	12.25	+2.00	15.75	2.50	18.25	3.25	18.75	4.25	19.25	4.75	20.75	5.25								
Wheatland *W4*	9.25	+6.00	12.25	+2.00	15.75	2.50	18.25	3.25	18.75	4.25	19.25	4.75	20.75	5.25								
Youngstown *Y1*	9.25	+6.00	12.25	+2.00	15.75	2.50	18.25	3.25	18.75	4.25	19.25	4.75	20.75	5.25	5.25	+20.25	1.25	+16.50	3.75	+13.00	5.25	+11.50
Indiana Harbor *Y1*	8.25	+9.00	13.25	+2.00	14.75	1.50	17.25	2.25	17.75	3.25	18.25	3.75	19.75	4.25								
Lorain *N2*	9.25	+6.00	12.25	+2.00	15.75	2.50	18.25	3.25	18.75	4.25	19.25	4.75	20.75	5.25	5.25	+20.25	1.25	+16.50	3.75	+13.00	5.25	+11.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	11.75	+2.00	15.75	2.00	18.75	6.50	19.25	5.25	19.75	6.25	20.25	6.75	20.75	5.50								
Youngstown *R3*	13.75	+4.00	17.75	list	20.75	4.50	21.25	4.25	21.75	5.25	22.25	5.75	22.75	5.50								
Fairless *N2*	11.75	+2.00	15.75	2.00	18.75	6.50	19.25	5.25	19.75	6.25	20.25	6.75	20.75	5.50								
Fontana *K1*	0.75		4.75		7.75		8.25		8.75		9.25		9.75									
Pittsburgh *J3*	13.75	+2.00	17.75	4.00	20.75	8.50	21.25	7.25	21.75	8.25	22.25	8.75	22.75	7.50	3.75	+17.75	3.75	+12.00	6.25	+10.50	11.25	+5.50
Alton, Ill. *L1*	11.75	+2.00	15.75	2.00	18.75	6.50	19.25	5.25	19.75	6.25	20.25	6.75	20.75	5.50								
Sharon *M5*	13.75	+4.00	17.75	list	20.75	4.50	21.25	4.25	21.75	5.25	22.25	5.75	22.75	5.50								
Pittsburgh *N1*	13.75	+2.00	17.75	4.00	20.75	8.50	21.25	7.25	21.75	8.25	22.25	8.75	22.75	7.50	3.75	+17.75	3.75	+12.00	6.25	+10.50	11.25	+5.50
Wheeling *W5*	13.75	+2.00	17.75	4.00	20.75	8.50	21.25	7.25	21.75	8.25	22.25	8.75	22.75	7.50								
Wheatland *W4*	13.75	+2.00	17.75	4.00	20.75	8.50	21.25	7.25	21.75	8.25	22.25	8.75	22.75	7.50								
Youngstown *Y1*	13.75	+2.00	17.75	4.00	20.75	8.50	21.25	7.25	21.75	8.25	22.25	8.75	22.75	7.50	3.75	+17.75	3.75	+12.00	6.25	+10.50	11.25	+5.50
Indiana Harbor *Y1*	12.75	+1.00	16.75	3.00	19.75	7.50	20.25	6.25	20.75	7.25	21.25	7.75	21.75	6.50								
Lorain *N2*	13.75	+2.00	17.75	4.00	20.75	8.50	21.25	7.25	21.75	8.25	22.25	8.75	22.75	7.50	3.75	+17.75	3.75	+12.00	6.25	+10.50	11.25	+5.50

Threads only, buttweld and seamless 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.
Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 11½¢ per lb.

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.68	T-1
18	4	1	—	5	2.385	T-4
18	4	2	—	—	1.185	T-2
1.5	4	1.5	8	—	1.04	M-1
6	4	3	6	—	1.43	M-3
6	4	2	5	—	1.185	M-2

High-carbon chromium	.83 D-3, D-5
Oil hardened manganese	.45 O-2
Special carbon	.41 W-1
Extra carbon	.345 W-1
Regular carbon	.29 W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb f.o.b.

	Cladding	Plate (A3, J2, L4) 10 pct	Plate (A3, J2, L4) 15 pct	Plate (A3, J2, L4) 20 pct	Sheet (I2) 20 pct
Stainless Type	302	.....	.....	.....	35.50
	304	36.20	40.30	44.50	37.75
	316	41.60	45.90	50.15	55.50
	321	37.95	42.10	46.40	44.75
	347	41.25	46.45	51.70	54.25
	405	29.20	33.15	37.05	.....
	410, 430	28.70	32.65	36.55	.....

CR Strip (S9) Copper, 10 pct, 2 sides, 39.85; 1 side, 33.00.

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Cold-Reduced (Coiled or Cut Length) Fully Processed
Field	9.90	9.20	.....
Armature	10.35	10.35	10.85
Elect.	11.00	11.025	11.525
Motor	12.05	12.075	12.575
Dynamo	13.05	13.05	13.55
Trans. 72	14.05	14.05	14.55
Trans. 65	14.60	Grain Oriented	
Trans. 58	15.10	Trans. 80	18.50
Trans. 52	16.15	Trans. 73	19.00

Producing points: Beech Bottom (W5); Brackenridge (A3); Granite City (G2); Indiana Harbor (I3); Mansfield (E2); Newport, Ky. (N5); Niles, O. (N3); Vandergrift (U1); Warren, O. (R3) (20¢ higher, HR); Zanesville, Butler (A7).

LAKE SUPERIOR ORES

51.50% *Fe natural content, delivered lower Lake ports. Prices for 1957 season. Freight changes for seller's account.*

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard Q Coated Nails Col	Woven Wire Fence Col	"T" Fence Posts Col	Single Loop Bale Ties Col	Galv. Barbed and Twisted Barbless Wire Col	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. ¢/lb.
Alabama City *R3*	167	181	...	195	187	8.10	8.50
Aliquippa, Pa. *J3***	164	179	...	...	181	8.20	8.875
Atlanta *A8***	166	182	...	192	190	8.05	8.65
Bartonville *K2***	166	182	...	198	190	8.30	9.00
Buffalo *W6*	...	...	...	...	...	8.20	8.75
Chicago, Ill. *N4***	164	180	167	196	188	8.35	9.10
Cleveland *A6*	173	...	...	...	...	8.20	8.75
Cleveland *A5*	...	...	...	...	...	8.20	...
Crawfordsville *M4***	166	182	...	198	190	8.30	9.05
Donora, Pa. *A5*	164	176	...	196	184	8.20	8.75
Duluth *A5*	164	176	167	196	184	8.20	8.75
Fairfield, Ala. *T2*	164	176	...	196	184	8.20	8.75
Galveston *D4*	169‡	...	...	...	...	...	...
Houston *S2*	169	181	...	195	189	8.45	9.00
Johnstown, Pa. *B3***	164	180	167	...	188	8.20	8.90
Joliet, Ill. *A5*	164	176	...	196	184	8.20	8.75
Kokomo, Ind. *C9**	166	178	...	198	186	8.30	8.85
Los Angeles *B2***	...	...	...	...	...	9.15	9.90
Kansas City *S2**	169	181	...	195	189	8.45	9.00
Minnequa *C6†*	169	181	172	201	189	8.45	9.00
Monessen *P6*	167	185	...	...	191	8.10	8.10
Palmer, Mass. *W6*	...	...	...	...	...	8.50	9.05
Pittsburg, Cal. *C7*	183	199	...	220	204	9.15	9.70
Rankin, Pa. *A5*	164	176	...	...	184	8.20	8.75
So. Chicago *R3*	167	181	...	195	187	8.10	8.50
S. San Francisco *C6†*	...	...	...	220	...	9.15	9.70
Sparrows Pt. *B3***†	166	...	...	198	190	8.30	9.00
Struthers, O. *Y1**	...	...	...	...	...	8.20	8.85
Worcester *A5*	170	...	...	...	...	8.50	9.05
Williamsport, Pa. *S5*	...	...	175	...	...	...	...

* Zinc less than .10¢. † Plus zinc extras.
** 11-12¢ zinc. ‡ Wholesalers only
*** .10¢ zinc.

WAREHOUSES

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery‡ Charge	Sheets: Hot-Rolled (18 ga. & hvr.)	Sheets: Cold-Rolled (15 gage)	Sheets: Galvanized (10 gage)††	Strip: Hot-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled (merchant)	Bars: Hot-Rolled (special quality)	Bars: Cold-Finished	Alloy Bars: Hot-Rolled 4615 As rolled	Alloy Bars: Hot-Rolled 4140 Annealed	Alloy Bars: Cold-Drawn 4615 As rolled	Alloy Bars: Cold-Drawn 4140 Annealed
Atlanta	.....	8.17	9.37	9.83	8.21	8.55	8.59	8.45	.....	10.23	.....	.....	.....	.....
Baltimore	.....$.10	7.98	9.08	9.31	8.46	8.36	8.85	8.53	.....	9.13	14.99	14.44	18.39	18.09
Birmingham	15	7.80	9.00	9.52	7.82	8.16	8.20	8.07	8.44	10.04-10.12	.....	.....	.....	.....
Boston	10	8.94	9.98	9.24	8.99	9.28	9.20	9.17	9.57	.....	15.79	14.79	19.14	18.39
Buffalo	15	8.00	9.15	10.83	8.20	8.65	8.65	8.40	8.85	8.85	15.65	14.65	19.01	18.25
Chicago	15	7.95	9.15	9.80	7.97	8.31	8.35	8.22	8.50	8.50	15.30	14.30	18.65	17.90
Cincinnati	15	8.09	9.20	9.80	8.29	8.67	8.89	8.53	8.87	8.99	15.61	14.61	18.96	18.21
Cleveland	15	7.93	9.13	9.70	8.07	8.54	8.72	8.31	8.67	8.75	15.39	14.39	18.74	17.99
Denver	.....	9.70	11.30	12.49	9.80	9.70	9.80	9.95	.....	10.65	.....	.....	.....	17.60
Detroit	15	8.18	9.40	10.15	8.32	8.66	8.89	8.52	8.86	8.85	15.46	14.56	18.81	18.16
Houston	.....	8.80	9.75	.....	7.75	8.80	8.00	8.05	.....	10.65	15.50	.....	19.30	19.05
Kansas City	20	8.52	9.72	10.07	8.60	8.83	8.87	8.73	.....	9.42	15.32	14.77	18.72	18.42
Los Angeles	10	9.20	10.90	11.35	9.25	9.75	9.25	9.10	9.30	12.20	16.45	15.60	20.30	19.70
Memphis	15	8.02	9.22	.....	8.12	8.35	8.39	8.25	.....	9.85	.....	.....	.....	.....
Milwaukee	15	8.08	9.28	9.93	8.10	8.44	8.56	8.35	8.71	8.72	15.43	14.43	18.78	18.03
New York	10	8.55	9.76	10.31	9.00	9.11	9.01	9.11	9.48	.....	15.02	14.69	18.42	18.29
Norfolk	20	8.00	.....	.....	8.40	8.35	8.70	8.45	.....	10.70	.....	.....	.....	.....
Philadelphia	10	8.25	9.17	10.39	8.92	8.78	8.80	8.81	9.18	9.41	15.61	14.61	18.96	18.21
Pittsburgh	15	7.93	9.14	10.15	8.07	8.31	8.35	8.22	8.59	8.75	15.30	14.30	18.65	17.90
Portland	.....	9.20	11.20	11.60	11.05	9.00	9.35	9.35	.....	13.80	16.70	16.10	20.40	20.25
San Francisco	10	9.05	10.40	10.90	9.05	9.30	9.15	9.15	9.90	12.40	16.45	15.60	20.30	19.70
Seattle	.....	9.55	10.70	11.65	9.55	9.30	9.35	9.50	9.85	13.40	16.55	15.85	19.50	19.45
Spokane	15	9.70	10.85	11.80	9.70	9.45	9.50	9.65	10.00	13.55	.....	16.75	.....	20.35
St. Louis	15	8.29	9.49	10.16	8.34	8.67	8.82	8.58	9.11	9.11	15.66	14.66	19.01	18.26
St. Paul	15	8.39	9.59	10.26	8.43	8.90	8.94	8.53	.....	9.21	.....	14.62	.....	18.27

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets for quantity.
† 16 gage. †† 13½¢ zinc. ‡ Deduct for country delivery.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Baltimore, Md. *T8*	9.20	10.40	12.60	15.60	18.55
Bristol, Conn. *W12*	...	10.40	12.60	15.60	18.55
Boston *T8*	9.20	10.40	12.60	15.60	18.55
Buffalo, N. Y. *R7*	8.65	10.10	12.30	15.30	18.25
Carnegie, Pa. *S9*	8.65	10.10	12.30	15.30	...
Cleveland *A5*	8.65	10.10	12.30	15.30	18.25
Detroit *D1*	8.75	10.20	12.40	15.40	...
Detroit *D2*	8.75	10.20	12.40	...	...
Dover, O. *G4*	8.65	10.10	12.30	15.30	18.25
Evanston, Ill. *M8*	8.65	10.10	12.30	...	...
Franklin Park, Ill. *T8*	8.75	10.10	12.30	15.30	18.25
Harrison, N. J. *C11*	...	...	12.60	15.60	18.55
Indianapolis *C5*	8.80	10.25	12.30	15.30	18.25
Los Angeles	10.85	12.30	14.50	...	...
New Castle, Pa. *B4*	8.65	10.10	12.30	15.30	...
New Haven, Conn. *D1*	9.10	10.40	12.60	15.60	...
Pawtucket, R. I. *N7*	9.20	10.40	12.60	15.60	18.55
Pittsburgh *S7*	8.65	10.10	12.30	15.30	18.25
Riverdale, Ill. *A1*	8.75	10.10	12.30	15.30	18.25
Sharon, Pa. *S1*	8.65	10.10	12.30	15.30	18.25
Trenton *R4*	11.05	10.40	12.60	15.60	18.55
Wallingford *W1*	9.10	10.40	12.60	15.60	18.45
Warren, Ohio *T4*	8.65	10.10	12.30	15.30	18.25
Worcester, Mass. *A5*	9.20	10.40	12.60	15.60	18.55
Youngstown *C5*	8.65	10.10	12.30	15.30	18.25

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
Babcock & Wilcox	2	13	36.34	42.56	33.21	.....
	2½	12	48.94	57.31	44.73	.....
	3	12	56.51	66.18	51.66	.....
	3½	11	65.97	77.25	60.30	.....
	4	10	87.61	102.59	80.07	.....
National Tube	2	13	36.34	42.56	33.21	.....
	2½	12	48.94	57.31	44.73	.....
	3	12	56.51	66.18	51.66	.....
	3½	11	65.97	77.25	60.30	.....
	4	10	87.61	102.59	80.07	.....
Pittsburgh Steel	2	13	36.34	42.56	.....	.....
	2½	12	48.94	57.31	.....	.....
	3	12	56.51	66.18	.....	.....
	3½	11	65.97	77.25	.....	.....
	4	10	87.61	102.59	.....	.....

(Effective May 21, 1957)

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	5.275	6.25	6.60				
Cleveland							13.85
So. Chicago *R3*				9.225			
Easley *T2*	5.275	6.25					
Fairfield *T2*		6.25		9.225		6.275	
Gary *U1*	5.275					6.275	
Huntington *C16*		6.25					
Ind. Harbor *I3*	5.275		6.60	9.225		6.275	
Ind. Harbor *Y1*				9.225			
Johnstown *B3*		6.25					
Joliet *U1*			6.60				
Kansas City *S2*				9.225			13.85
Lackawanna *B3*	5.275	6.25	6.60			6.275	
Lebanon *B3*							13.85
Minnequa *C6*	5.275	6.75	6.60	9.225		6.275	13.85
Pittsburgh *P5*							13.85
Pittsburgh *J3*				9.225			
Seattle *B2*				9.725		6.425	13.85
Steelton *B3*	5.275		6.60			6.275	13.85
Struthers *Y1*				9.225			
Torrance *C7*						6.425	
Williamsport *S5*		6.15					
Youngstown *R3*				9.225			

COKE

Furnace, beehive (f.o.b. oven) Net-Ton
Connellsville, Pa. ..... $15.00 to $15.75
Foundry, beehive (f.o.b. oven)
$17.50 to $19.00

Foundry oven coke

Buffalo, del'd	$31.75
Detroit, f.o.b.	30.50
New England, del'd	31.55
Kearney, N. J., f.o.b.	29.75
Philadelphia, f.o.b.	29.50
Swedeland, Pa., f.o.b.	29.50
Painesville, Ohio, f.o.b.	30.50
Erie, Pa., f.o.b.	30.50
Cleveland, del'd	32.65
Cincinnati, del'd	31.84
St. Paul, f.o.b.	29.75
St. Louis, f.o.b.	31.50
Birmingham, f.o.b.	28.85
Milwaukee, f.o.b.	30.50
Neville, Is., Pa.	29.25

ELECTRODES

Cents per lb, f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE			CARBON*		
Diam. (In.)	Length (In.)	Price	Diam. (In.)	Length (In.)	Price
24	84	24.75	40	100,110	10.70
20	72	24.00	35	110	10.70
16 to 18	72	24.50	30	110	10.85
14	72	25.00	24	72 to 84	11.25
12	72	25.50	20	90	11.00
10	60	26.50	17	72	11.40
10	48	27.00	14	72	11.85
7	60	26.75	12	60	12.95
6	60	30.00	10	60	13.00
4	40	33.25	8	60	13.30
3	40	35.25			
2½	30	37.25			
2	24	57.75			

* Prices shown cover carbon nipples.

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper
Cast elliptical, 18 in. or longer, 5000 lb lots 47.92
Electrodeposited 39.25
Brass, 80-20, ball anodes, 2000 lb or more 50.00
Zinc, ball anodes, 2000 lb lots 21.25
(for elliptical add 2¢ per lb)
Nickel, 99 pct plus, rolled carbon, 5000 lb 1.0225
(Rolled depolarized add 3¢ per lb)
Cadmium 1.70
Tin, ball anodes and elliptical $1.07 per in.

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum 74.80
Copper sulphate, 100 lb bags, per cwt. 24.35
Nickel salts, single, 100 lb bags ... 40.50
Nickel chloride, freight allowed, 300 lb 45.50
Sodium cyanide, domestic, f.o.b. N. Y., 200 lb drums 23.05
(Philadelphia price 23.30)
Zinc cyanide, 100 lb 59.00
Potassium cyanide, 100 lb drum N. Y. 48.00
Chromic acid, flake type, 100,000 lb or more 31.00

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)
Pct Discounts

Machine and Carriage Bolts	Full Container Price	30 Containers	20,000 Lb.	40,000 Lb.
½" and smaller x 6" and shorter	52½	56½	58½	59½
⅝" thru 1" x longer than 6"	43½	47½	50	51½
Rolled thread carriage bolts ½ in. & smaller x 6 in. and shorter	52½	56½	58½	59½
Lag, all diam. x 6" & shorter	52½	56	58	59
Lag, all diam. longer than 6 in.	44½	48	50	51
Plow bolts, ½" and smaller x 6" and shorter	52	55½	57	58

(Add 25 pct for broken case quantities)

Nuts, Hex, HP reg. & hvy.

	Full Case or Keg Price
¾ in. or smaller	61½
⅞ in. to 1 in. inclusive	57½
1⅛ in. to 1½ in. inclusive	62½
1⅝ in. and larger	56

C. P. Hex reg. & hvy.

¾ in. and smaller	61½
⅞ in. to 1½ in. inclusive	57½
1⅝ in. and larger	56

Hot Galv. Nuts (All Types)

¾ in. and smaller	48

Semi-finished Hex Nuts

¾ in. or smaller	61½
⅞ in. to 1½ in. inclusive	57½
1⅝ in. and larger	56

(Add 25 pct for broken case or keg quantities)

Finished

1 in. and smaller	64

Rivets

	Base per 100 lb
½ in. and larger	$11.50
	Pct Off List
7/16 in. and smaller	23

Cap Screws

	Discount (Packages) *Bright*	*Treated*	*H. C. Heat*
New std. hex head, packaged			
⅝" diam. and smaller x 6" and shorter	44		31
¾", ⅞" and 1" diam. x 6" and shorter	27		9
⅝" diam. and smaller x longer than 6"	14		+ 6
¾", ⅞" and 1" diam. & longer than 6"	½		+24

	C-1018 Steel Full-Finished Cartons	Bulk
¼" through ⅝" dia. x 6" and shorter	44	61
¾" through 1" dia. x 6" and shorter	27	49

Minimum quantity—¼" through ⅝" diam., 15,000 pieces; 1/16" through ⅝" diam., 5,000 pieces; ¾" through 1" diam., 2,000 pieces.

Machine Screws & Stove Bolts

Plain Finish	Quantity	Discount Mach. Screws	Discount Stove Bolts
Cartons		19	32
Bulk			
To ¼" diam. incl.	25,000-200,000	9	54
5/16 to ½" diam. incl.	15,000-100,000	9	54
All diam. over 3" long	5,000-100,000	—	54

Machine Screw & Stove Bolt Nuts

	Quantity	Discount Hex	Discount Square
In cartons		16	19
In Bulk			
⅝" diam. & smaller	15,000-100,000	7	9

CAST IRON WATER PIPE INDEX

Birmingham	119.0
New York	131.7
Chicago	134.1
San Francisco-L. A.	141.8

Dec. 1955 value, Class B or heavier 6 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

REFRACTORIES

Fire Clay Brick

Carloads per 1000

First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5.00)	$135.00
No. 1 Ohio	120.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	120.00
No. 2 Ohio	103.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $2.00)	21.50

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$150.00
Childs, Hays, Pa.	155.00
Chicago District	160.00
Western Utah	175.00
California	180.00
Super Duty Hays, Pa., Athens, Tex., Windham, Warren, O., Morrisville	157.00-160.00
Silica cement, net ton, bulk, Latrobe	28.50
Silica cement, net ton, bulk, Chicago	25.50
Silica cement, net ton, bulk, Ensley, Ala.	26.50
Silica cement, net ton, bulk, Mt. Union	24.50
Silica cement, net ton, bulk, Utah and Calif.	37.00

Chrome Brick

Per net ton

Standard chemically bonded, Balt.	$105.00
Standards chemically bonded, Curtiner, Calif.	115.00
Burned, Balt.	99.00

Magnesite Brick

Standard, Baltimore	$131.00
Chemically bonded, Baltimore	116.00

Grain Magnesite

St. ⅜ to ½-in. grains

Domestic, f.o.b. Baltimore in bulk	$73.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev.	
in bulk	46.00
in sacks	52.00-54.00

Dead Burned Dolomite

Per net ton

F.o.b. bulk, producing points in:	
Pa., W. Va., Ohio	$16.00
Midwest	16.35
Missouri Valley	16.00

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh

Swedish sponge iron, del. East of Miss. River, ocean bags, 23,000 lb. and over	10.5¢
F.O.B. Riverton or Camden, New Jersey, West of Miss. River	9.5¢
Domestic sponge iron, 98+% Fe, 23,000 lb. and over del'd. East of Miss River	10.5¢
F.O.B. Riverton, New Jersey, West of Miss. River	9.5¢
Canadian sponge iron, del'd in East, carloads	9.5¢
Electrolytic iron, annealed, imported 99.5+% Fe	27.5¢
domestic 99.5+% Fe	36.5¢
Electrolytic iron, unannealed minus 325 mesh, 99+% Fe	57.0¢
Electrolytic iron melting stock, 99.84% pure	22.0¢
Carbonyl iron size 3 to 20 micron, 98%, 99.8+% Fe	88.0¢ to $2.90
Aluminum, freight allowed	38.00¢
Brass, 10 ton lots	37.50¢ to 50.00¢
Copper, electrolytic	45.75¢
Copper, reduced	49.75¢
Cadmium, 100-199 lb, 95¢ plus metal value	
Chromium, electrolytic, 99.85% min. Fe .03 max. Del'd	$5.00
Lead	8.90¢ plus metal value
Manganese f.o.b. Exton, Pa.	46.0¢
Molybdenum, 99%	$3.60 to $3.95
Nickel, unannealed	$1.00
Nickel, annealed	$1.06
Nickel, spherical, unannealed #80	$1.13
Silicon	43.50¢
Solder powder	7.0¢ to 9.0¢ plus met. value
Stainless steel, 302	$1.02
Stainless steel, 316	$1.20
Tin	14.00¢ plus metal value
Tungsten, 99% (65 mesh)	$4.00 (nominal)
Zinc, 10 ton lots	18.75¢ to 32.50¢

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Representatives: New York • Philadelphia

Screw Machine Products since 1913

1/8" to 2 5/8" CAPACITY

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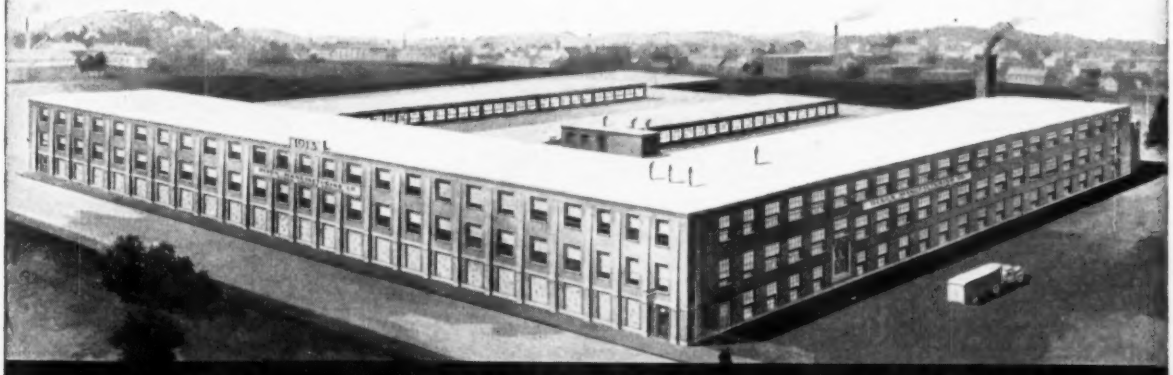

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that "NEEDED LIFT" can come from EUCLID CRANES & HOISTS

You name the job or jobs to be done! We'll supply a crane or cranes that will do it. Standard Models in a wide range of styles, sizes and capacities will generally meet your requirements. If not, we'll engineer and build what you need. We've been doing it for more than 40 years.

TO

"RAISE PROFITS"

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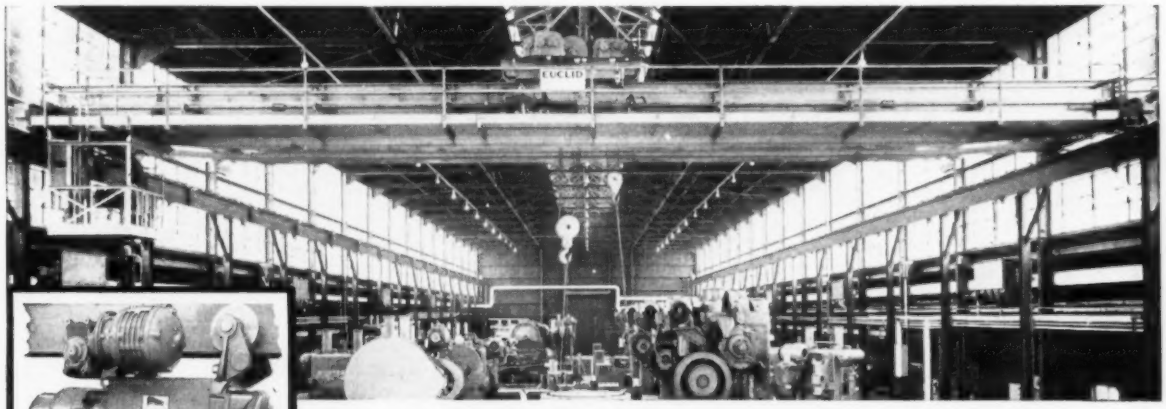

In Capacities from 2000 to 50,000 lbs.

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EUCLID HOISTS are highly efficient and strictly modern in every detail with oversize anti-friction bearings and heat treated steel parts in combination with a welded frame.

The planetary gearing and mechanical load brake are mounted in oil tight housings. The hoist gearing is assembled in the hoist drum.

This design produces an unusual compact, rugged and accessible hoist readily adapted to various installations and types of control.

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THE EUCLID CRANE & HOIST COMPANY

1361 CHARDON ROAD • CLEVELAND 17, OHIO

FERROALLOY PRICES

(Effective May 21, 1957)

Ferrochrome

Contract prices, cents per lb contained Cr, lump, bulk, carloads, del'd. 67-71% Cr, 30-1.00% max. Si.

0.02% C	41.50	0.20% C ... 38.50
0.03% C	41.00	0.50% C ... 38.25
0.06% C	39.50	1.00% C ... 37.50
0.10% C	39.00	1.50% C ... 37.35
0.15% C	38.75	2.00% C ... 37.25

4.00-4.50% C, 67.70% Cr, 1-2% Si.. 27.75
5.50-6.00% C, 67-64% Cr, 2.00-4.50% Si 27.75
0.025% C (Simplex) 34.75
0.10% C, 50-52% Cr, 2% max Si .. 35.50
8.50% max. C, 50-55% Cr, 3-6% Si . 24.00
8.50% C, 50-55% Cr, 3% max. Si... 24.00

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max 0.10% C price schedule. Add 5¢ for each additional 0.25% of N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10% max. C	$1.31
0.50% max. C	1.31
9 to 11% C, 88-91% Cr, 0.75% Fe	1.40

Electrolytic Chromium Metal

Contract prices per lb of metal 2" x D plate (⅜" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.

Carloads	$1.29
Ton lots	1.31
Less ton lots	1.33

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-45%, C 0.05% max.) Contract price, carloads, delivered, lump, 8-in. x down, per lb of Cr, packed.

Carloads	44.65
Ton lots	48.95
Less ton lots	51.45

Calcium-Silicon

Contract price per lb of alloy, lump, delivered, packed.
30-33% Cr, 60-65% Si, 3.00 max. Fe.

Carloads	25.65
Ton lots	27.95
Less ton lots	29.45

Calcium-Maganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered, packed.
16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	24.25
Ton lots	26.15
Less ton lots	27.15

SMZ

Contract prices, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 10% Fe ½ in. x 12 mesh.

Ton lots	20.15
Less ton lots	21.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots	17.30
Ton lots	18.70
Less ton lots	19.95

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 53%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	18.50
Ton lots to carload packed	19.65
Less ton lots	20.90

Ferromanganese

Maximum contract base price, f.o.b., lump size, base content 74 to 76 pct Mn.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	12.75
Johnstown, Pa.	12.75
Sheridan, Pa.	12.75
Philo, Ohio	12.75
S. Duquesne	12.75

Add or subtract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk	14.80
Ton lots packed	17.20

Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$100.50
19 to 21%	3% max.	102.50
21 to 23%	3% max.	105.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.
95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	45.75
Ton lots	47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads	34.00
Ton lots	36.00
250 to 1999 lb	38.00
Premium for Hydrogen-removed metal	0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn... 25.50

Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	37.15	39.95	41.15
0.07% max. C	35.10	37.90	39.10
0.10% max. C	34.35	37.15	38.35
0.15% max. C	33.60	36.40	37.60
0.30% max. C	32.10	34.90	36.10
0.50% max. C	31.60	34.40	35.60
0.75% max. C, 80.85% Mn, 5.0-7.0% Si....	28.60	31.40	32.60

Silicomanganese

Contract basis, lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢ f.o.b. shipping point.

Carloads bulk	12.80
Ton lots	14.45
Briquet contract basis carloads, bulk, delivered, per lb of briquet	15.10
Ton lots, packed	16.50

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $106.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, packed.

	Ton lots, packed	Carloads, packed
96.75% Si, 1.25% Fe	23.70	22.40
98% Si, 0.75% Fe	24.45	23.15

Silicon Briquets

Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si, briquets.

Carloads, bulk	7.7¢
Ton lots, packed	10.5¢

Electric Ferrosilicon

Contract prices, cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si	13.00	75% Si	16.40
65% Si	15.25	85% Si	18.10
	90% Si	19.50	

Ferrovanadium

50-55% V contract, basis, delivered, per pound, contained V, carloads, packed.

Openhearth	$3.30
Crucible	3.30
High speed steel (Primos)	3.40

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$3.05	$2.95	$3.75
Less ton lots	3.40	3.30	4.55

Alsifer, 20% Al, 40% Si, 40% Fe.

Contract basis, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads	10.65¢
Ton lots	11.80¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound Contained Mo

$1.33

Ferrocolumbium, 50-50%, 2 in. x D contract basis, delivered per pound contained Cb.

Ton lots	$5.10
Less ton lots	5.15

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, contract basis, del'd ton lots, 2-in. x D per lb con't Sb plus Ta

$4.35

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth Pa., per pound contained Mo

$1.83

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $4.00 unitage, per gross ton

	$90.00
10 tons to less carload	$110.00

Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb. contained Ti

$1.33

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti

	$1.50
Less ton lots	$1.54

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton

$240.00

Ferrotungsten, ¼ x down, packed, per pounds contained W, ton lots delivered

$2.95 (nominal)

Molybdic oxide, briquets, per lb contained Mo, f.o.b. Langeloth, Pa.

	$1.41
bags, f.o.b. Washington, Pa., Langeloth, Pa.	$1.33

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per lb.

Carload, bulk lump	18.50¢
Ton lots, packed lump	20.50¢
Less ton lots	21.00¢

Vanadium oxide, 86-89% V_2O_5 contract, basis, per pound contained V_2O_5

$1.33

Zirconium contract basis, per lb of alloy

35-40% f.o.b. freight allowed, carloads, packed	27.25¢
12-15%, del'd lump, bulk-carloads	9.25¢

Boron Agents

Borosil, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B

2000 lb carload $5.50

Bortam, f.o.b. Niagara Falls,

Ton lots per pound	45¢
Less ton lots, per pound	50¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5%, f.o.b., Suspension Bridge, N. Y., freight allowed.

Ton lots per pound ..... 14.00¢

Ferroboron, 17.50 min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots

1.30

F.o.b. Wash., Pa., Niagara Falls, N. Y., delivered 100 lb up

10 to 14% B	.85
14 to 19%	1.20
19% min. B	1.50

Grainal, f.o.b. Bridgeville, Pa., freight, allowed, 100 lb and over

No. 1	$1.05
No. 79	50¢

Manganese-Boron, 75.00% Mn, 15.20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.

Ton lots	$1.46
Less ton lots	1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots

$2.15

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PERFORATED METALS

The few perforations illustrated are indicative of the wide variety of our line—we can *perforate almost any size perforation in any kind of metal or material required.* Send us your specifications.

Sixty-seven years of manufacturing perforated metals for every conceivable purpose assure satisfaction.

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BRASS, ZINC, ANY METAL, ANY PURPOSE

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TOTAL: 4,000 TONS
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Make rigid set-ups in minutes on planers, drill presses, milling machines or other T-slotted beds or platens. Clamp slides or rotates to position on anchoring T-slot bolt. Drop forged, heat-treated body. Heat-treated screw has V-slotted swivel cap.

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up to 125-TON CAPACITY

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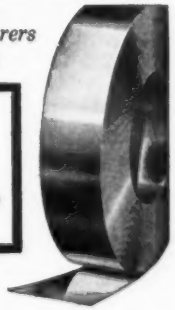
more and more manufacturers are saying: "Let's use

GRIFFIN®
COLD ROLLED STRIP STEEL"



Made to your specifications in all thicknesses from .012 to .375 inches and widths from ⅛" to 19" depending upon gauge.

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creates a DUCTILE VALVE HOUSING

Control valve in a hot blast line in a blast furnace

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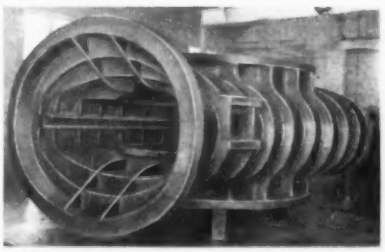

Craftsmen in Kutztown's Pattern Shop, Molding Department, Machine Shop, Inspection and Test Departments all contribute their skills in producing intricate castings to exacting specifications . . . and to meet all ASME, ASTM or API codes. Average output 40 tons daily of medium and heavy castings ranging from 100 lbs. to 25 tons each. Green sand, dry sand and loam molding. Whether the castings you need are classified as usual or unusual, we are anxious to prove to you that Kutztown castings are accurately and economically produced!

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"ANYTHING containing IRON or STEEL"

Demand Stays Strong At Pittsburgh

Used machinery buyers there, while getting price conscious, are still active.

Bar mills, presses, electric equipment and cranes are among the popular items.

▪ Despite some problems created by the money shortage, most used equipment is in good demand at Pittsburgh.

However, all types of buyers are very price conscious. Lower priced steel rolling mills are wanted. Electric motors are in good demand but the emphasis is on replacement work rather than expansion projects. And on expansion projects, there are signs that equipment is being bought for specific jobs rather than for long-range programs.

Bar Mills Popular — Dealers in steel mill equipment report a good demand for bar mills. This is attributed by one dealer to booming construction activity in this country and abroad. He said the mills are going to small merchant operations and need equipment to roll small shapes for building work.

The problem is to find the bar mills. One dealer says the supply has dried up completely. Another was able to buy a complete bar mill plant. However, most of the equipment contained has already been resold. The dealer in question recently had an inquiry for three sizes of bar mills and could only supply the smallest.

Price Haggling—Dealers in machine tools and fabricating equipment report healthy activity but say price is a problem. "Buyers are offering half what you want," says one dealer. He felt that this price consciousness was working in favor of the used machinery man in one way. He said some plants that would normally buy new equipment are now turning to used models for price reasons.

Another dealer had not felt this trend but said there was a downgrading of business at the other end. He said small shops were now taking older models than formerly, again to save money. Same source called business "quick but tight." Plants are buying for jobs on hand and they are resisting dealer prices.

Presses and Shears Strong—In general, fabricating machines are doing better than machine tools. Plate working equipment is called particularly popular. Presses, shears and press brakes are in steady demand and one dealer says current inquiries indicate a broad pickup around July 1.

Electric motors, motor-generator sets, transformers and other electrical items are moving very well. This is particularly true of special jobs but for all electrical items business is good and has been all year. One dealer cited three breakdown jobs in one day and said he has not been able to keep up with his work. He felt, however, that replacement business was keeping things humming.

Crane Demand Good—A crane dealer reports considerable interest in hoists. He recently sold two 10-ton hoists in Alabama, and now has inquiries for similar units from Cuba. In addition there have been inquiries for 2-ton and 3-ton hoists.

CONSIDER GOOD USED EQUIPMENT FIRST

AIR COMPRESSOR
450 cu. ft. Ingersoll Rand XRE, 100# Pressure
100 H.P. Westinghouse Motor 440/3/60
BENDER & STRAIGHTENER
Pels JH-26 All Steel Bender & Straightener Cap'y 15" Beams, 18" Channels, 8X8X1⅛" Angles
BENDING ROLLS
16' x ⅜" Ransome Pyramid Type
27' x 1" Southwark, Pyramid Type
BRAKES—LEAF TYPE
8' x 3/16" Dreis & Krump
12' x ¼" Dreis & Krump
12' x ½" Dreis & Krump No. 228
BRAKES—PRESS TYPE
8' x ¼" Geo. A. Ohl
10' x 5/16" Pacific Hydraulic
14' x ⅛" Superior Hydraulic—NEW
CORRUGATING MACHINE
12" Stanco Corrugating Machine, Rolls 24" Dia.
CRANES—OVERHEAD ELECTRIC TRAVELING

3 ton P&H	56' Span 220/3/60
5 ton Euclid	30' Span 220/3/60
5 ton Whiting	48' Span 230-3/60 A.C.
5 ton Case	59' Span 220/3/25
8 ton P&H	55' Span 220/3/60
10 ton Shepard Niles	27' Span 220/3/60
10 ton Shepard Niles With 5 ton Auxiliary	38' Span 440/3/60
10 ton Shepard Niles	58' Span 220/2/60
15 ton Shepard Niles	52' Span 230 Volt D.C.
25 ton Cleveland With 10 ton Auxiliary (Mill Type)	70' Span 220/3/60

CRANE TROLLEY
10 ton P&H Type HMR Crane Trolley, Motors 440/3/60, Magnetorque Contactor, Panel
DIEING MACHINE
60-ton Henry & Wright, Roll Feed, Scrap Cutter 4" Stroke NEW 1950
FORGING MACHINES
1" to 5" Acme, Ajax, National
HAMMERS—BROAD DROP—STEAM DROP—STEAM FORGING—800 lb to 20,000 lb.
HEADERS
#33 Waterbury Farrel Hi-Speed DS SD Capacity ½"
LEVELERS—ROLLER
37" Torrington, 19 Roll 1-31/32" Dia. Backed up
48" Aetna Standard, 17 Rolls 3⅜" Dia.
54" McKay, 7 Rolls, 3⅜" Dia.
108" American, 17 Rolls, 4½" Dia.
PRESSES—HYDRAULIC
200 ton Farquhar Straightening Press 18" Stroke, Working Area 12" long
800 ton Clearing, 48" Stroke, Bed 48 x 48"
4500 Baldwin-Lima-Hamilton Hydr. Forging Press
PRESSES—STRAIGHT SIDE
110 ton Cleveland 55D-54, 5" Stroke
Bolster 32" x 54", Air Cushion
150 ton Cleveland 65D-60, 6" Stroke
Bolster 40" x 60", Air Cushion
PUNCH & SHEAR COMBINATIONS
Cleveland Style G Single End, 60" Throat
Cleveland Style W, 60" Throat
No. 1½" Buffalo Universal Ironworker
ROLLING MILLS
6" x 5" Torrington Wire Flattening Mill Line
9" Bar Mill
10" x 14 Single Stand Two High
12" x 12" Single Stand Two High
12" x 16" Single Stand Two High
16" x 24" Farrel Two Stand Two High
26" x 72" Cold Rolling Mill
22" x 40" Three High Sheet Mill
SHEAR—ALLIGATOR
No. 1 Mesta RH LK, Capacity 2 x 12"
SHEAR—BAR
No. 12 Buffalo Armor Plate
Capacity 5" to 15" Beams & Channels
48" Mesta Bar Shear, Capacity 4" x 35" Slabs Hot, Motor Drive with 75 H.P. D.C. Motor
SHEAR—GATE
12" x ⅜" Niagara Model 1212, NEW 1951
SHEAR LINES
18" x 3/16" Hallden, With Coil Box, Leveler Tables, etc.
96" x 14 Ga. Cleveland, With Payoff, Leveler, Elect. Equip., etc.
SHEARS—SQUARING
6' x 10" Ga. Niagara No. 672
8' x ¼" Niagara NEW 1952
SLITTERS
36" Wean Slitting Line
36" Parson Slitting Line
42" Illinois Slitting Line
STRAIGHTENERS
No. 3 Medart 3 Roll, Capacity to 4½" Tubing
SWAGING MACHINE
24 Fenn, Capacity 2½" Tubing, LATE
2½A Fenn, Capacity 2¾" Tube 3¾" Solid 19" Die Length Hydraulic Feed, LATE
TUBE MILL
Etna 1K Welded Tube Mill, Cut-off & Transformer Capy. ½" OD 0.28 wall to 2" OD .120 wall

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ELECTRIC POWER EQUIPMENT
A. C. MOTORS
3 phase—60 cycle

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Qu.	H.P.	Make	Type	Volts	Speed
2	1750	G.E.	M-579BS	4800	1800
1	1500	G.E.	MT	6600	1187
1	1100	F.M.	OVZK, B.B.	4800	1800
1	800	G.E.	MT	2300	293
1	750	G.E.	MT-573	2200	1190
1	700	A.C.		2300	500
1	500	Whse.	CW	550	350
1	400	Whse.	CW	440	514
1	350	Cr.Wh.	Size 71	208/416	1765
1	350	G.E.	IM-17A	440/2200	720
1	250	G.E.	MT-424Y	4000	257
1	250	Cr.Wh.	Size 290	2300	350
1	250	Al. Ch.		550	600
1	200	G.E.	IE12 B-M	220/440	1760
1	200	G.E.	MT-557Y	220/440	1760
1	200	Cr. Wh.	20QB	440	505
1	200	G.E.	IM	440	435
3	200	G.E.	I-17AM	2200	435
1	200	G.E.	IM	2200	580
1	150	(unused) Whse.	CW	2300	435
1	125	A.C.		440	865
1	125	Al. Ch.		440	720
1	100	G.E.	IM-16	2200	435
1	100	G.E.	IM	440	600
4	100	A.C.	ANY	440	695

SQUIRREL CAGE

1	800	G.E.	KT-573	2200	1180
1	650	G.E.	FT-559BY	440	3570
3	500	Whse.	CS-1916	2300	500
2	450	Whse.	CS-1420	2300/4150	351
1	400	G.E.	IK	2200	500
1	300	G.E.	KT-559A	2300	1775
1	200	G.E.	IK-17	440	580
2	200	G.E.	KT-557	440	1800
1	150/75	G.E.	IK	440	900/450
1	150	Whse.	CS8356S	440	880
1	150	Whse.	CS	440	580

SYNCHRONOUS

Qu.	H.P.	Make	Types	Volts	RPM
1	7000	G.E.	ATI	2200/6600	600
1	4350	C.W.	3561SL4000	6900/13800	514
1	2850	Whse.	Sp.f	2300/4600	514
1	2800	Whse.	Sp.f	2300	120
1	2000	Whse.		2300	120
2	1750	G.E.	ATI	2200	3600
1	735	G.E.	ATI	2200/12000	600
1	450	Whse.		2200	128.5
1	325	G.E.	ATI	440	1800
1	295	G.E.	ATI	440	1800
1	100	G.E.	TSI-7558	220/440	900

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2500 lb. Erie Single Leg Steam Forg. Hammer

No. 7 Ajax Forging Press, 700-ton capacity

3—2-ton Denison Auto. Hopper Feed & Index Table Hydr. Multipress

25 Transformer and Generating Arc Welders

2500 lb. Model E Chambersburg Steam Drop Hammer, New 1944

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28" 8' cc Betts Bridgeford axle lathe, two carriages
26" x 22" cc Bridgeford heavy duty selective geared head engine lathe
Model 3D Gisholt Simplimatic, platen type, automatic
20" x 32" cc Fay Automatic lathe, MD
20" x 30" cc LeBlond geared head, Timken bearing, hardened ways, production
15" x 30" cc Lipe Carbomatic hydraulic, production lathe
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18" Cincinati single automatic bed type
No. 3 Sundstrand Rigidmill, bed type, production
2-24 Cincinnati Simplex automatic production
4-36 Cincinati hydromatic bed type production
34-36 Cincinnati duplex hydromatic
MILLS, BORING
52" Gisholt vertical boring and turning mill PRT
4" bar universal Tri-Way horizontal table type
3½" No. 5 Deflance horizontal, table type
3" bar Model 30 Universal Tri-Way table horizontal
MILLS, INGERSOLL
42" x 42" x 18' Ingersoll planer type, adjustable rail
48" x 20" x 20' Ingersoll planer type
24" x 96" Ingersoll vertical milling
72" Ingersoll 2 spindle continuous rotary
PRESSES
400 ton No. EG54 Ferracute upward working coining-embossing
600 ton No. 664 Toledo tierod frame, knuckle joint, coining
200 ton No. 7 x 72" Bliss double crank, straight side, tierod, air clutch
120 ton Model 60-D-66 Cleveland S.S., DC, and tierod frame
350 ton No. 18T Cleveland S.S. double action toggle drawing
148 ton No. A-6½ Niagara OBI BG, late
80 ton No. UA80 Niagara steel cast frame, adjustable knee, punching
800 ton Model 2E-48-800 Hamilton S.S. SC, air clutch, new 1947
750 ton No. 3 National Maxipress, late
SAWS
10½" x 10½" No. 3 Motch & Merryweather, cold metal, late
6" x 6" Pearless universal shaping
6" x 6" No. 6 Marvel high speed
UPSETTERS
1" Ajax steel frame, air clutch, motor drive

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1—**#4 United Sheet Bar Shear, 26" Knives,** complete with 30 H.P. DC Motor and Tables.

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6 spindle W. F. & John Barnes Vertical Drilling Machine, m.d.
3 spindle Rockford 12" Gang Drill, m.d.
4 spindle No. 201¼ Barnes, H.D., m.d.
2 spindle Moline Adjustable Rail
6 spindle Model M1613 Pratt & Whitney In Line Vertical Drill

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20" Cincinnati-Bickford Super - Service Prod. Drill, m.d.
No. 2AL Natco Holesteel Vertical, m.d.
No. 2 Colburn Mfg. Type, m.d.
No. 4-48" Defiance Machine Co., Drill, m.d.
No. 201¼" Barnes Single Sp. Self-Oiling All Geared Drill & Tapper, m.d.
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No. 61 Fellows, belted, m.d.
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No. 61A Fellows, m.d., latest type
No. 64S Fellows, m.d.
No. 624A3 Fellows, m.d.
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1	1500	G.E.	514	250	2300/4000
1	1150	Whse.	900	600	2300/4000
2	1250	Al Ch.	720	600	2300/4000
1	850	G.E.	720	240/350	2300
1	725	Whse.	900	600	2300/4000
1	500	Cr Wh.	720	600	2300/440
1	500	G.E.	900	250	2300
1	300	Whse.	1200	125/250	2300
1	300	Al Ch. (3-unit)	1200	250/300	2300
2	200	Whse.	1200	125/250	2300/440
2	150	Rel.	1200	125	2300/440
1	150	Whse.	1200	125/250	2300/440
1	150	G.E.	1200	250	1600/2300
1	100	Whse.	720	125/250	220
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1**	700	Whse.	Encl.	143
1	700	Whse.	Encl.	300/700
2**	600	Whse.	Mill	300/1600
1	600	Whse.	QM	110/220
1	400	G.E.	MPC	450
1	300	Whse.	Mill	300/900
1	300	Whse.	Mill	300
2	275	Whse.	QM	125/850
1	200/250	El Dy.	Ped. Brg.	400/1200
1	180	G.E.	MPC	400
1	175	G.E.	CD-175-A	850/1025
1	125	Whse.	SK-184	575/850
1	80	Rel.	651-T	575/1150
1	80	El Dy.	25-S	525/1050
1	60/75	Whse.	SK-151	250/1000
1	50	Whse.	SK	500/1500
1	50	Whse.	SK-141	250/1000
2	30/40	Whse.	SK-143	500/1500
1	35	Whse.	SK	250/1000
1	32½	Whse.	SK-150	400/1200
1	25	Whse.	SK-121	200/1200
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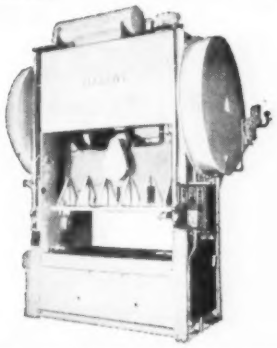

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200	Cr.-Wh.	CM	500
175	G.E.	ETC	750
100	G.E.	MPC	400/800
100	G.E.	RC-34	2500
100	G.E.	RC-19	525
100/150	G.E.	MCF	280/1000
50	Cr.-Wh.	CMC	700/1100
35	West. (2)	SK-150	550/1000
30	Cr.-W.	CCM-504	450
20/10	G.E. (2)	CD-125	400/1600
20/10	G.E.	CD-115	500/1500
25/20	G.E. (2)	RF-12	500/1500
25	G.E.	RC-32	800
25	Westg.	SK-133	575
20/25	Westg.	SK-151L	250/1000
20	Star	SB-10	1750
15	Westg.	SK-103	400/1600
10/15	Reliance	185P	400/1600
10/15	Westg.	SK-121	250/1000

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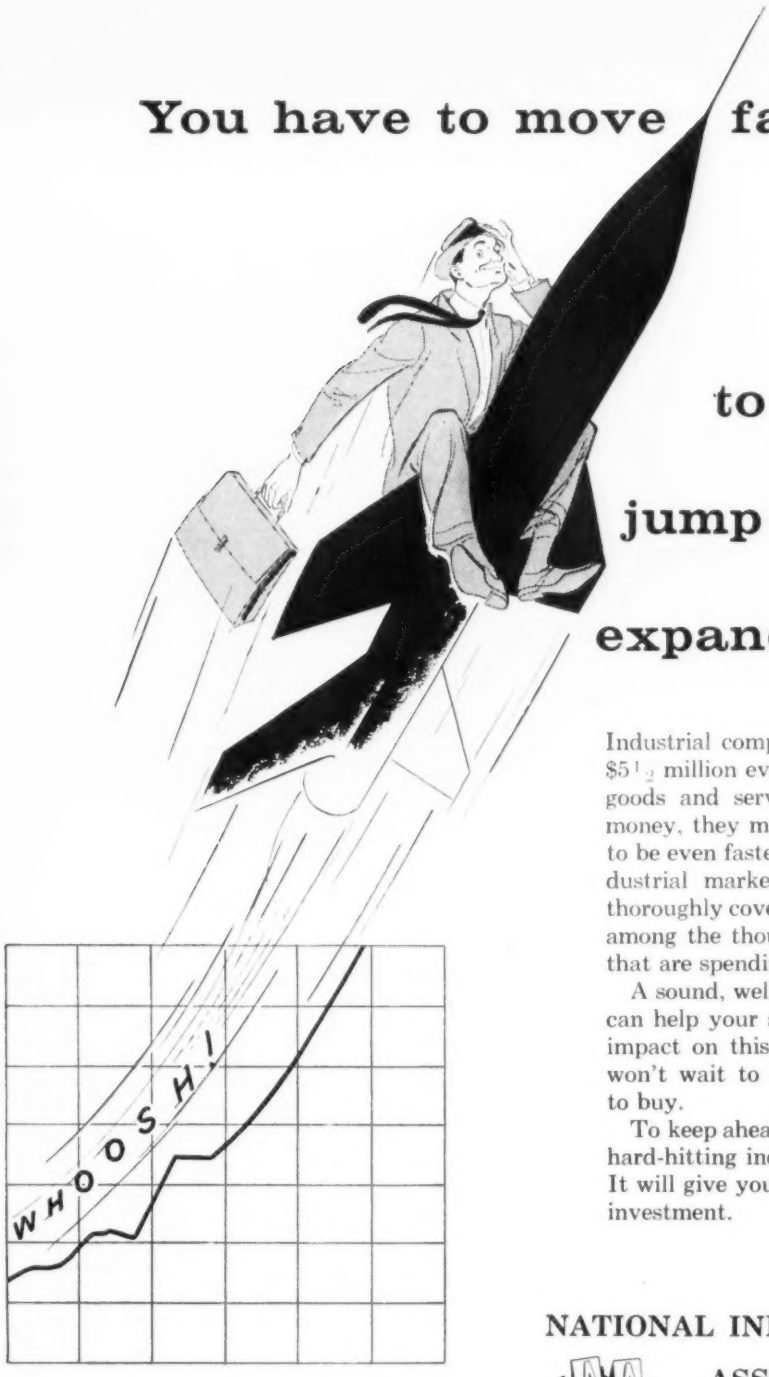

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Plane Cutback (Continued from p. 85)

tions at the test site and the usual costs of coordination of two separate locations.

"Against these costs must be laid those of the capital outlays for a separate integrated facility and the comparative operating differentials."

Plant Disposal—If the decision is to build completely new facilities, the Air Force will have to dispose of existing plants: ". . . we simply cannot afford to support double cost structures."

Gen. Baker indicated the Air Force favors locating new plants some distance from heavily-populated areas: "We certainly should not plan to permit population growth and encroachment to surround any new locations and thus lead to their later restricted use or possible relocation." At the same time, he recognized the need for a labor force within reasonable commuting distance.

Sub-Contractors Warned — Gen. Baker further warned sub-contractors that when work falls off in prime contractor plants, the primes will likely limit the amount of work let out to sub-contractors. Sub-contracting now accounts for about 30 pct of the air frames and missiles frames program, Gen. Baker said, adding:

"It will be an important volume of business to the primes with which to support their skilled and technical payrolls. Since the products involved in this sub-contracting are of the primes' own engineering and design, their manufacture is generally compatible with the primes' production capacity."

Electronics Outlook—The Air Force procurement chief also pointed out that missiles contain a much higher proportion of control systems than do manned aircraft, are of simpler frame construction and smaller in size. "These factors portend," he said, "that a great deal less airframe sub-contracting for off-site production may be necessary for their manufacture."

Gen. Baker, in effect, told the electronics industry to get on the ball and look into the problems involved in working with prime contractors. "The trend to fewer systems and fewer prime contractors should be examined closely by these people and appropriate plans and action taken or they may find themselves precluded from the future systems markets," he said.

Scrap Non-Competitive, Dealers Say

A House Small Business Committee under Rep. Patman (D-Tex.), probing the scrap industry, has heard charges from some small dealers that a few large scrap firms have taken over the industry, driving other operators out of business. The government's attempt to hold down scrap exports over the past 18 months have furthered the concentration, according to the complaints.

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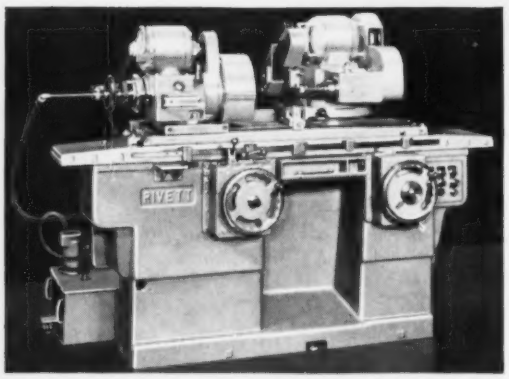
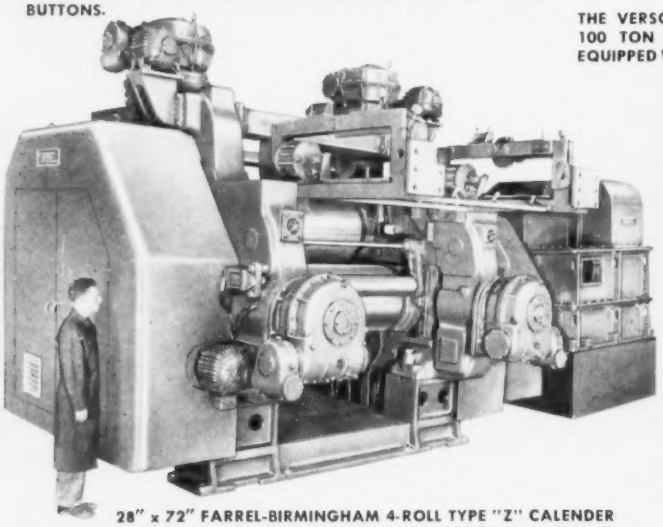
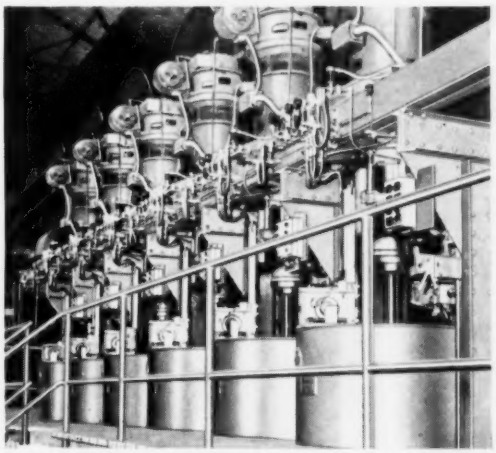


THE RIVETT 1024 INTERNAL AND UNIVERSAL GRINDER MADE BY RIVETT LATHE AND GRINDER INC., INCLUDES CUTLER-HAMMER THREE-STAR MOTOR CONTROL AND NEW OIL-TIGHT PUSH-BUTTONS.

THE VERSON ALLSTEEL PRESS COMPANY'S 100 TON GANG PUNCHING MACHINE IS EQUIPPED WITH CUTLER-HAMMER CONTROL.



28" x 72" FARREL-BIRMINGHAM 4-ROLL TYPE "Z" CALENDER IS EQUIPPED WITH CUTLER-HAMMER THREE-STAR MOTOR CONTROL AND HEAVY DUTY OIL-TIGHT PUSHBUTTONS.



THE WESTERN STATES MACHINE COMPANY INSTALLS CUTLER-HAMMER THREE-STAR MOTOR CONTROL ON THEIR ELECTRICALLY DRIVEN CENTRIFUGALS.

Stars that have no Equal

There is no such thing as the manufacturer of a bad product in American industry; competition is too keen for such a company to live. But there are degrees of merit. Among machinery builders, there are those whose products are accepted as being better than others, and a few whose machines are widely recognized as the best. These machinery builders are the acknowledged leaders in their field . . . *they have no equal*. This position of leadership was not easily won nor is it held without constant attention to every detail which influences the product's performance. It is most significant that so many of these leaders standardize on Cutler-Hammer Three-Star Motor Control as original equipment for their machines . . . *the stars have no equal*. Machinery buyers find Cutler-Hammer Motor Control a reliable guide to greater value and satisfaction. CUTLER-HAMMER, Inc., 1325 St. Paul Ave., Milwaukee 1, Wis. *Associate:* Canadian Cutler-Hammer, Ltd., Toronto.